

# THE IRON AGE

A Review of the Hardware, Iron Trades.

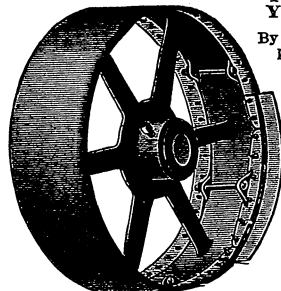
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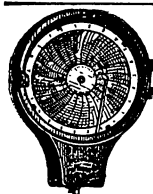
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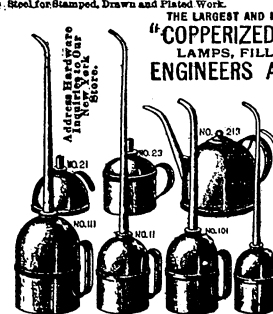
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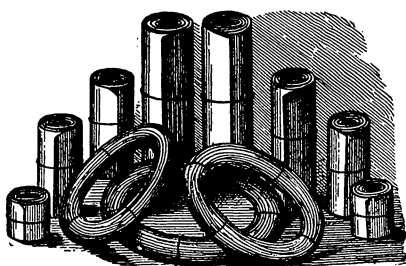
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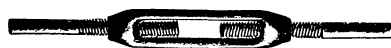
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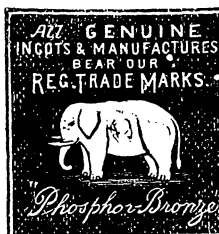
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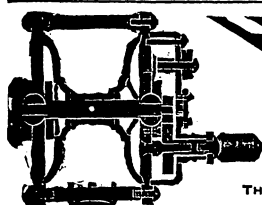
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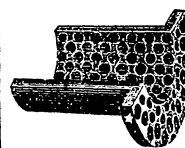
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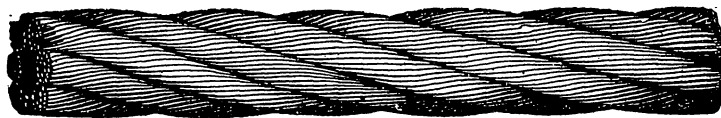
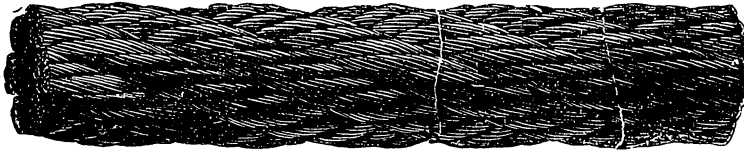
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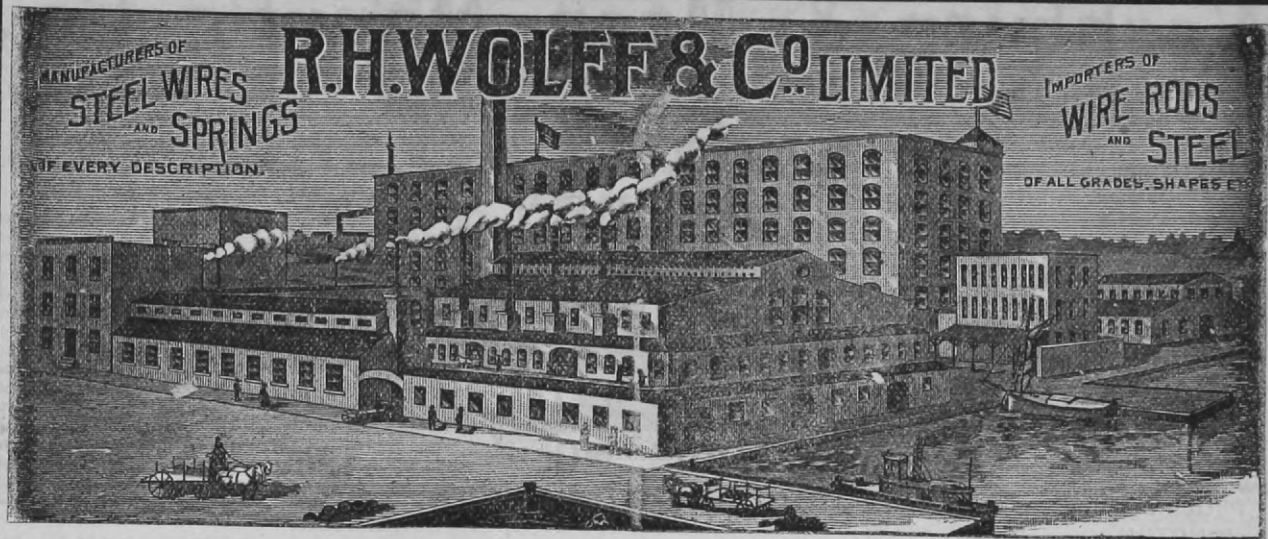
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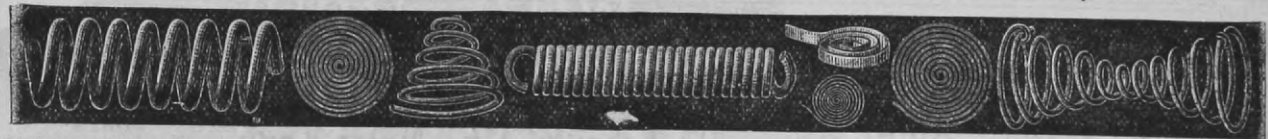
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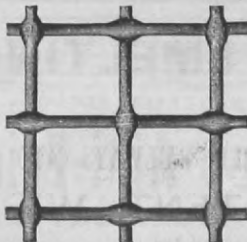
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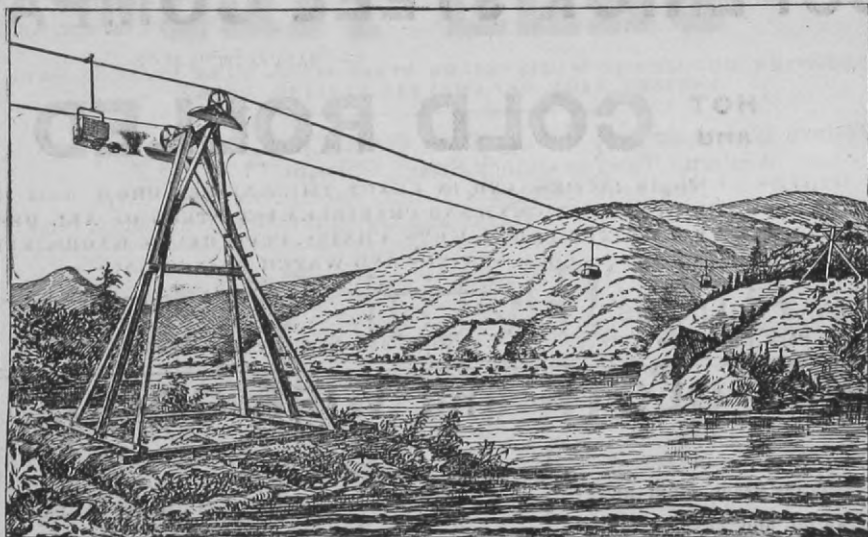
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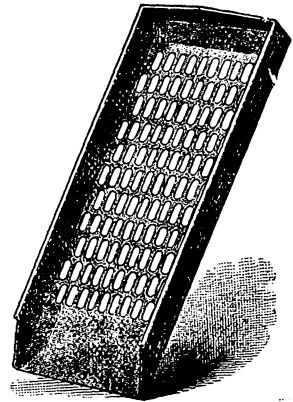
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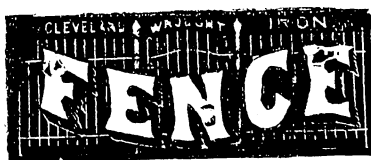
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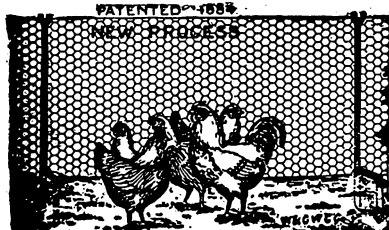
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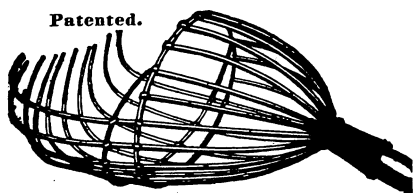
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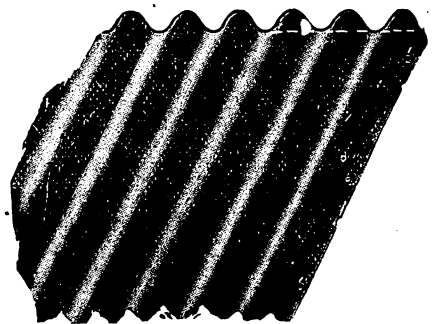
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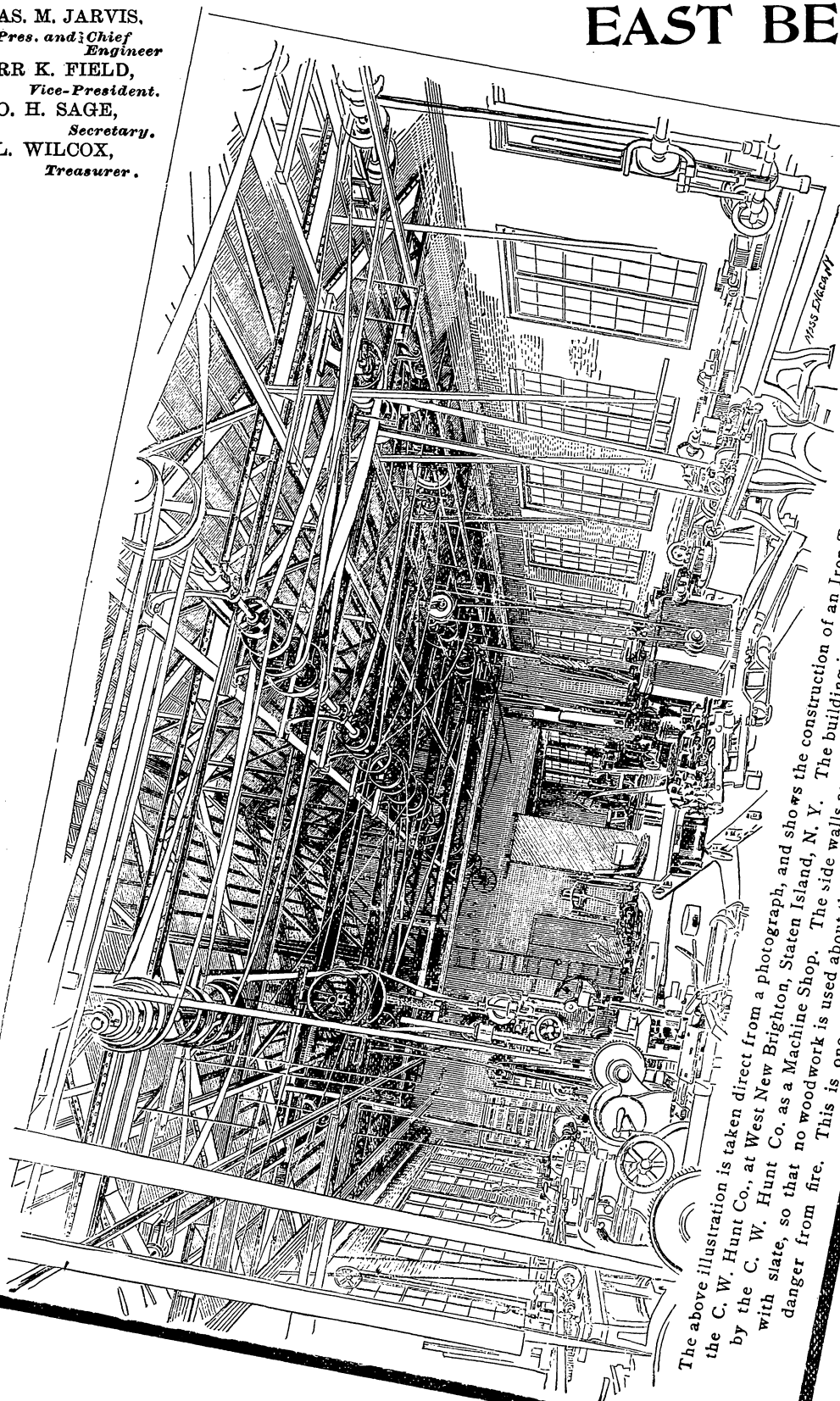
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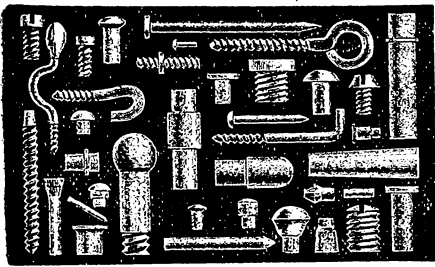
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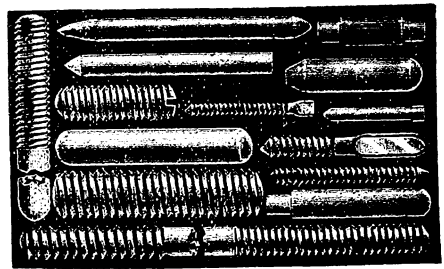
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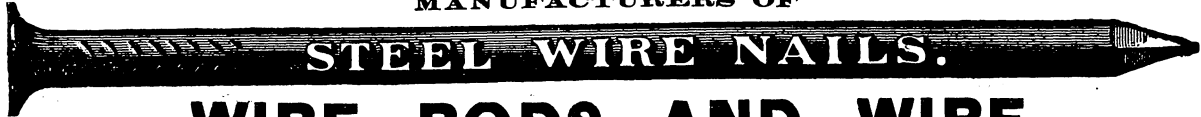


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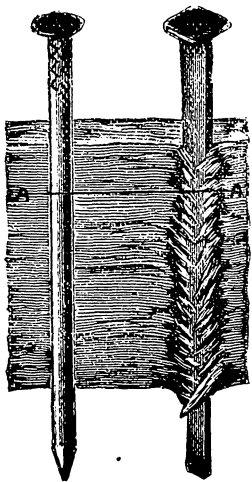
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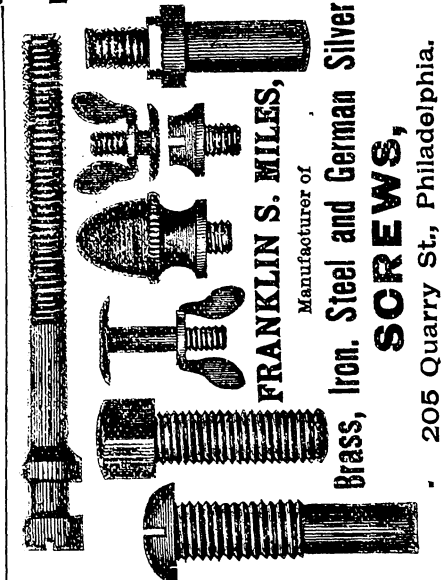
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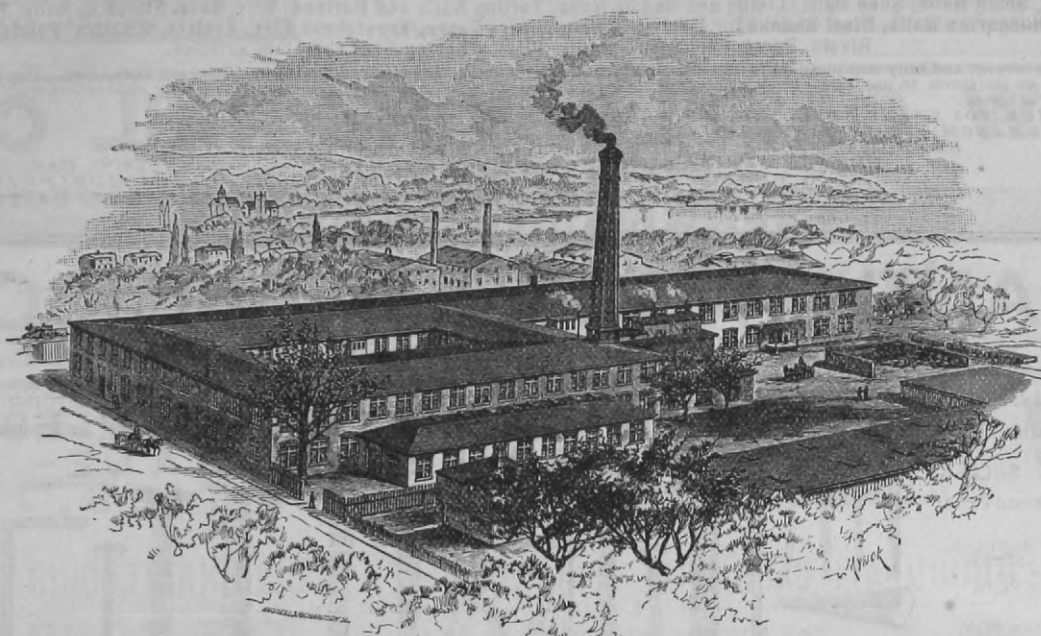
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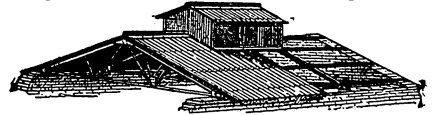
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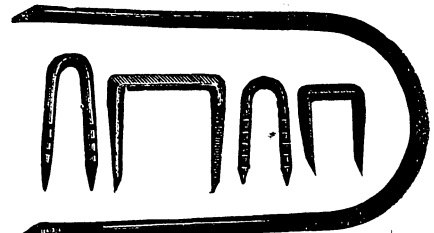
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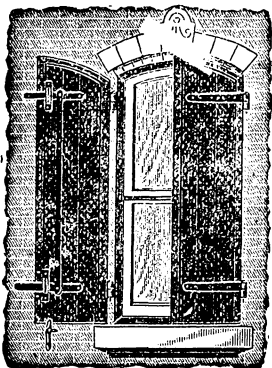
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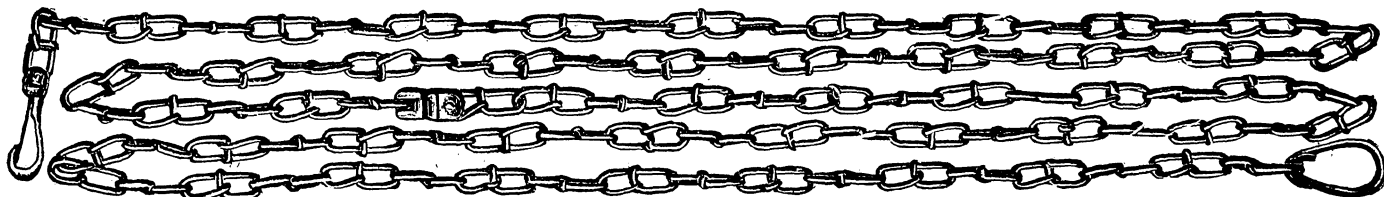
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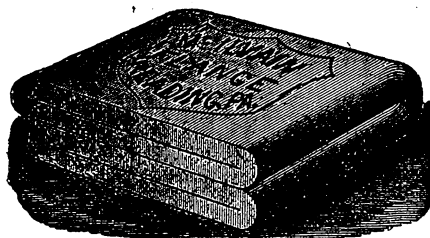
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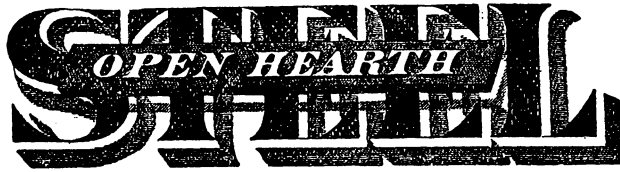
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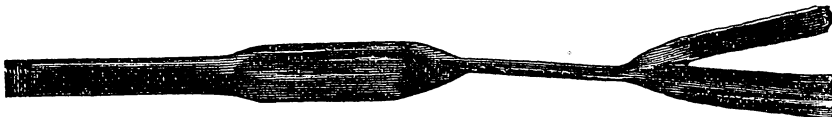
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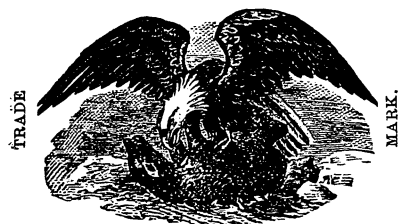
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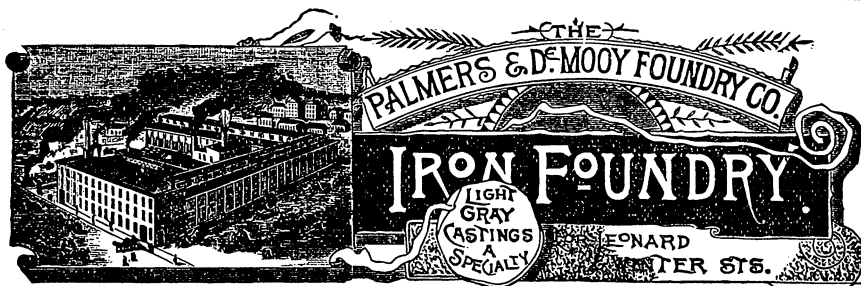
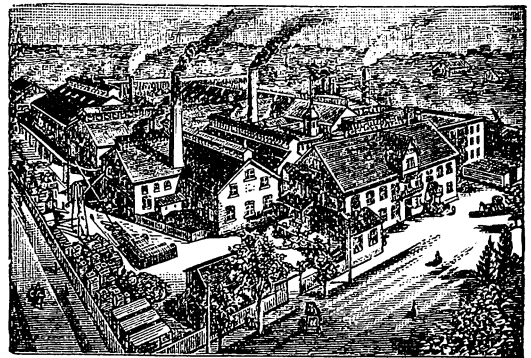
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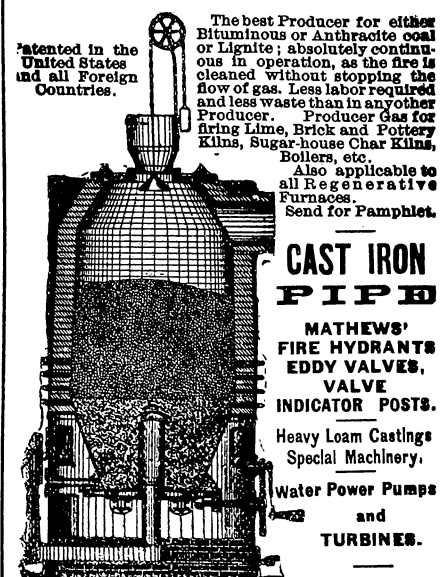
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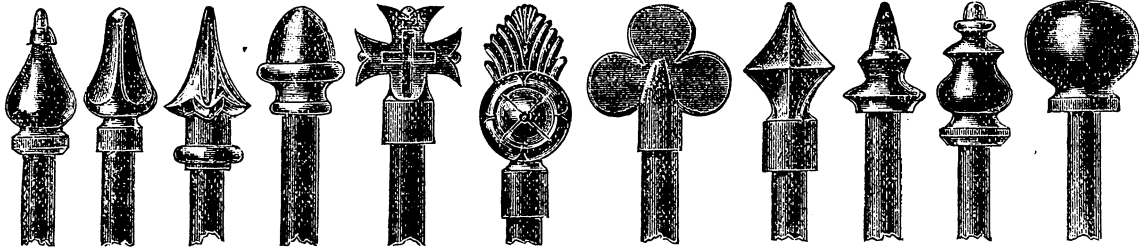
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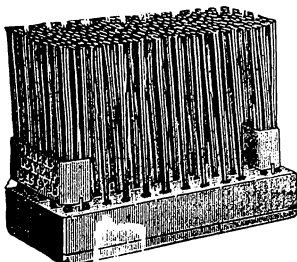
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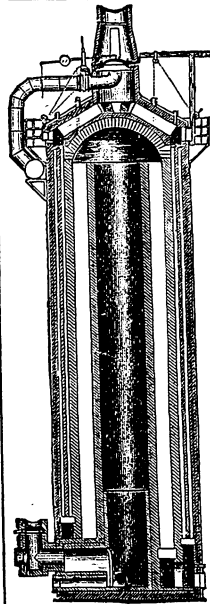


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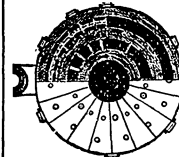
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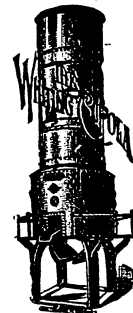
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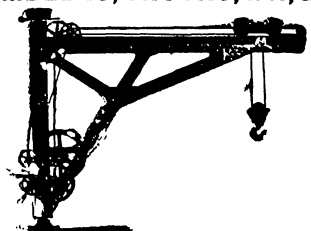


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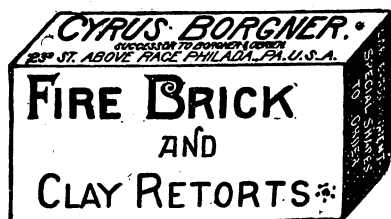
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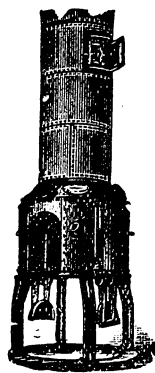
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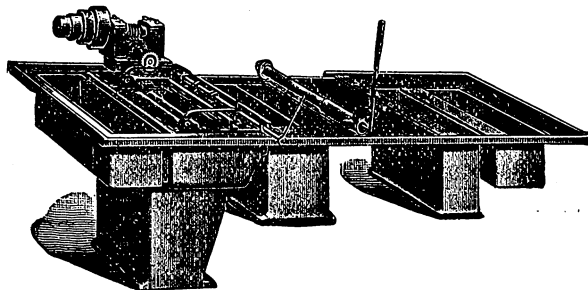
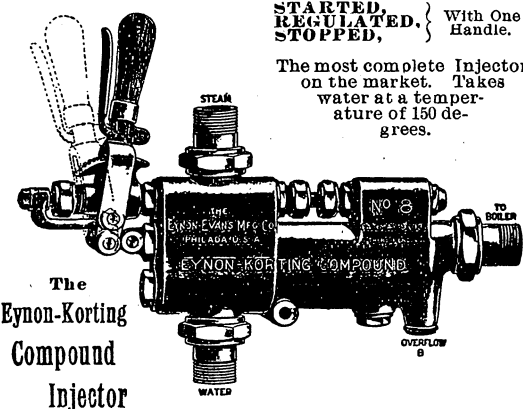
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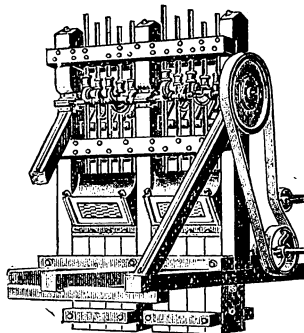
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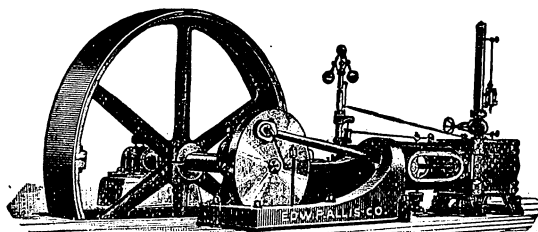
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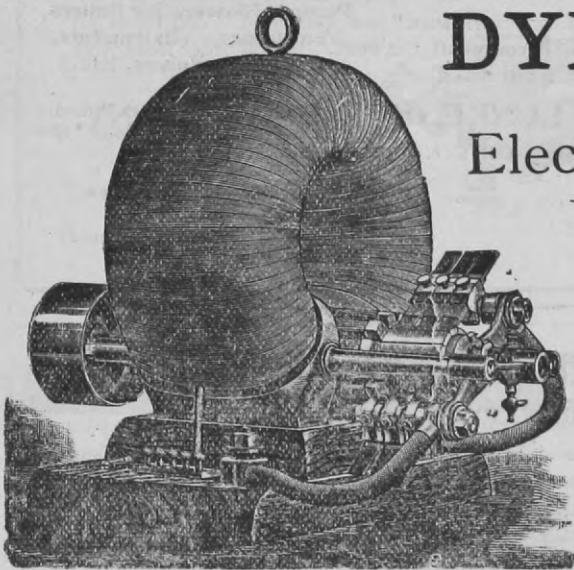
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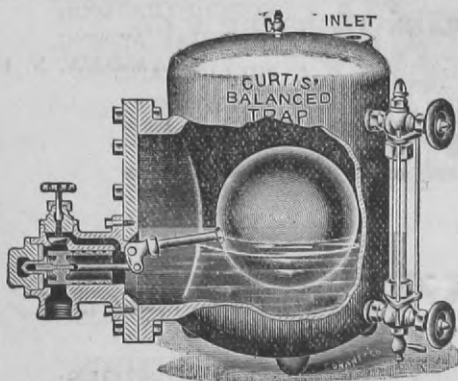
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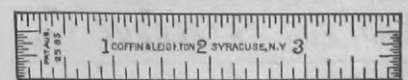
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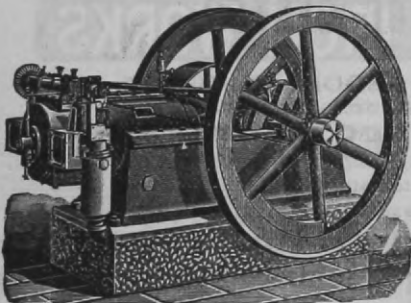
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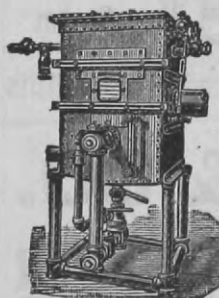
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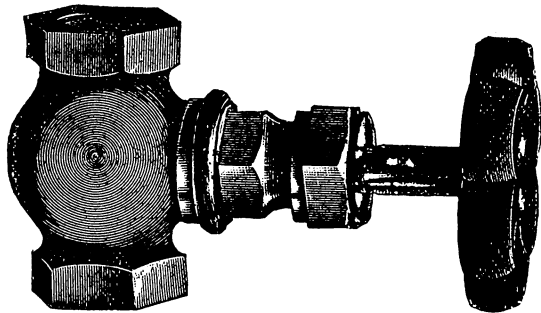
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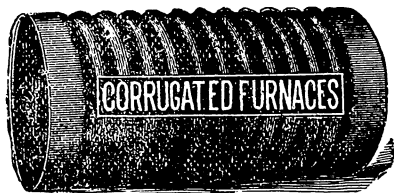
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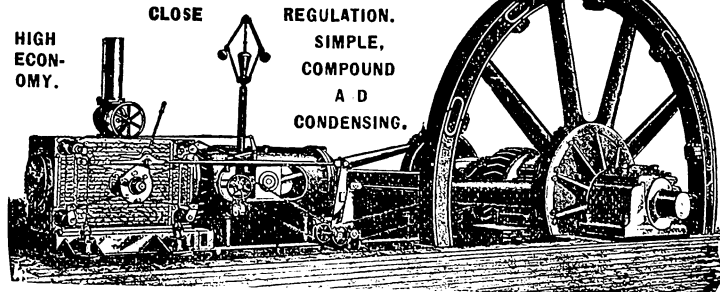
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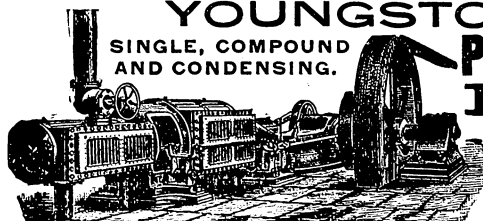
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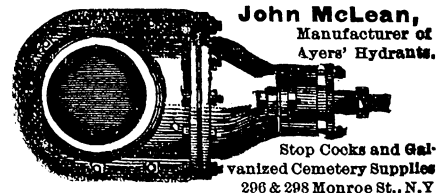
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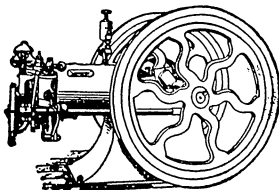


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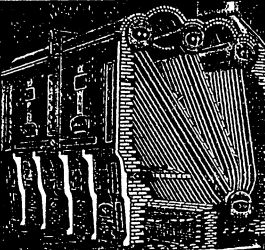
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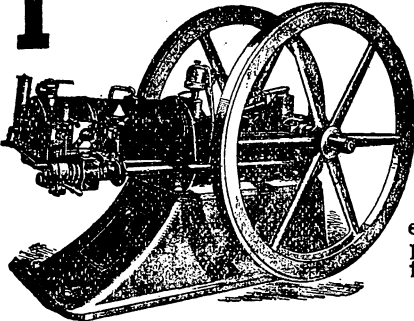
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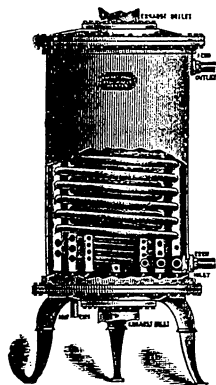
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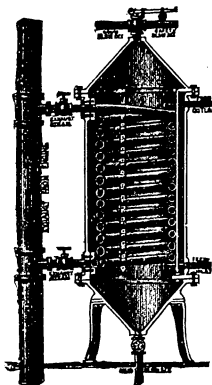
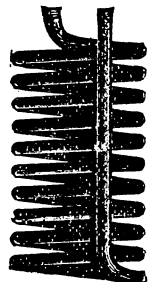
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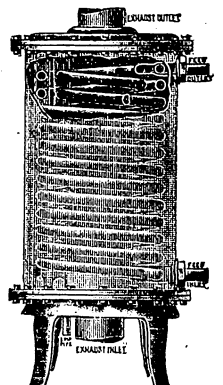
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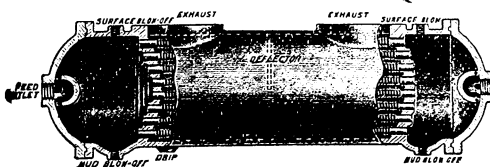
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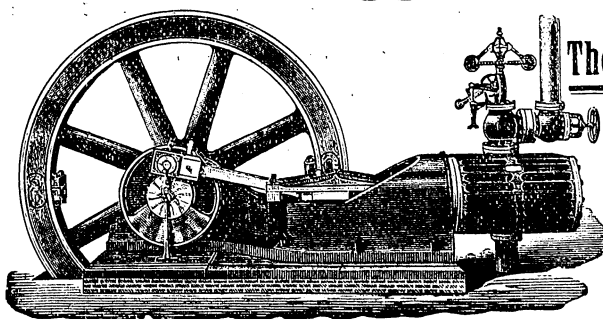
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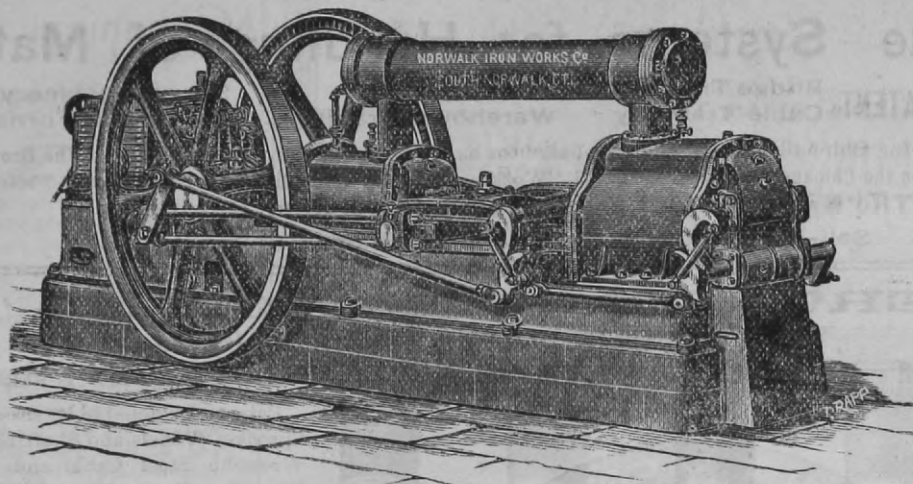
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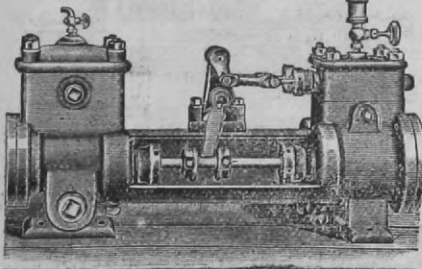
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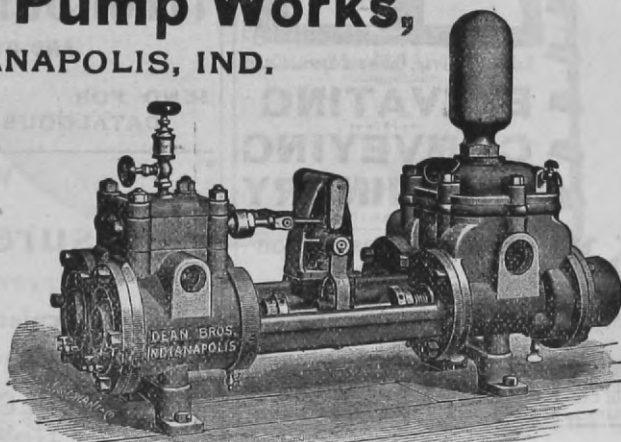
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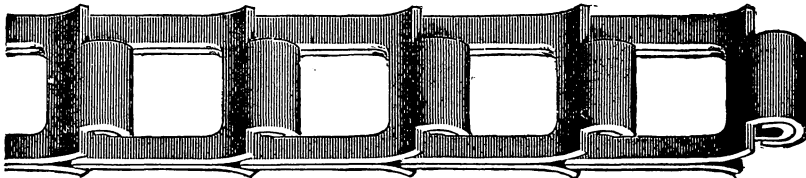
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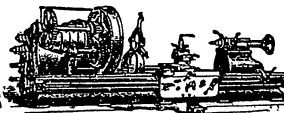
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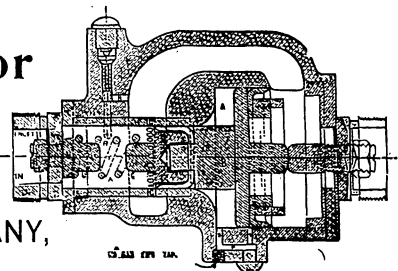
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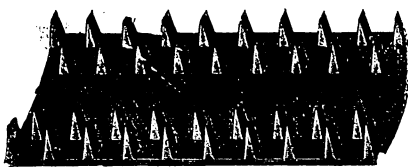
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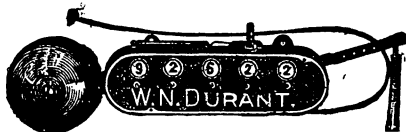
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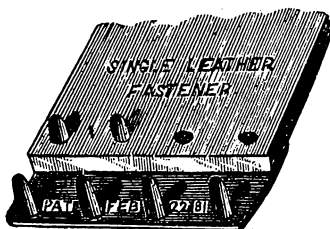
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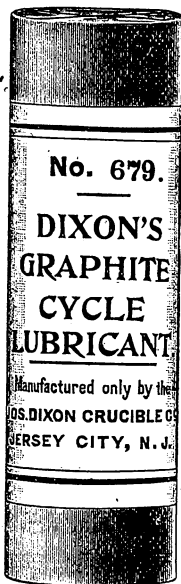
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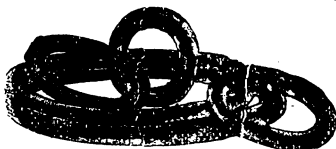
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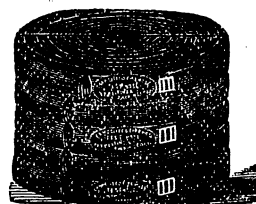


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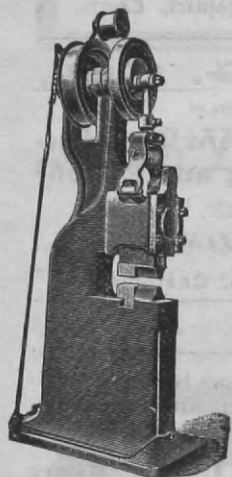
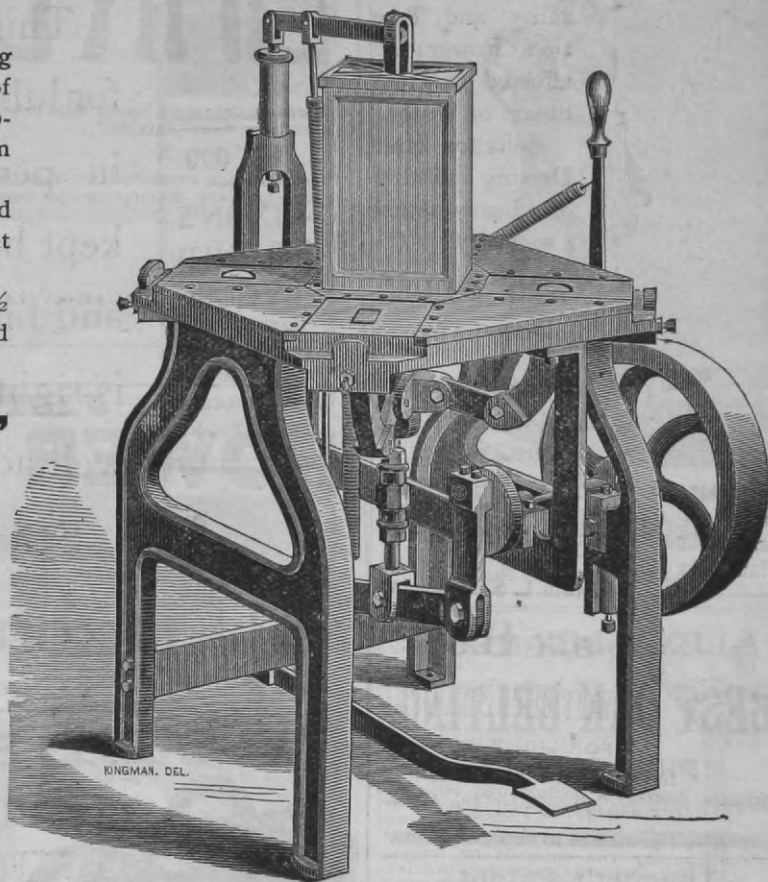
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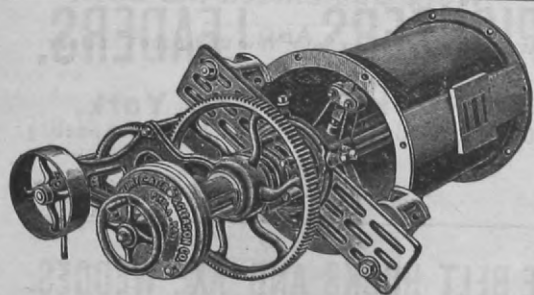


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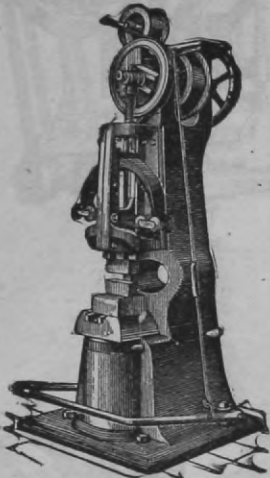
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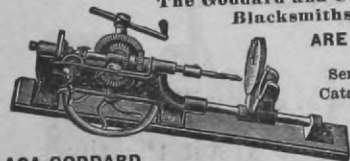
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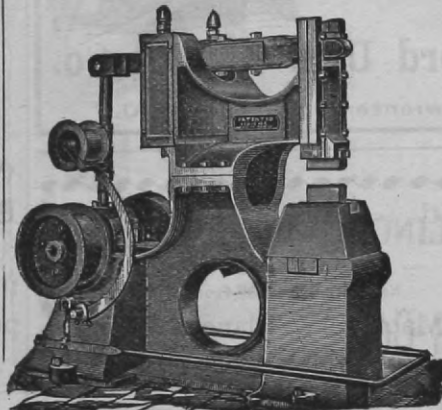
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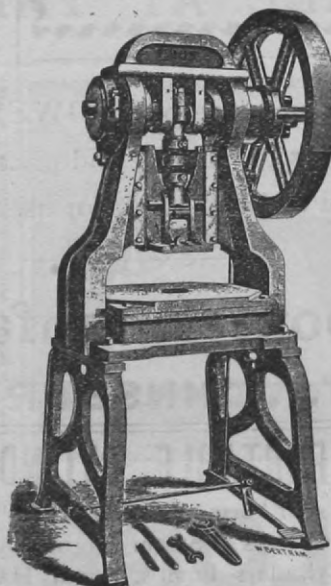
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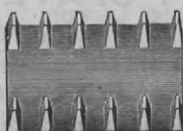
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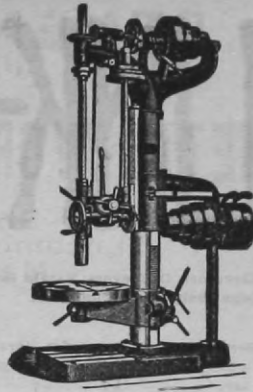
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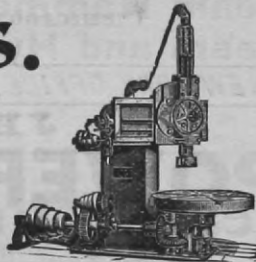
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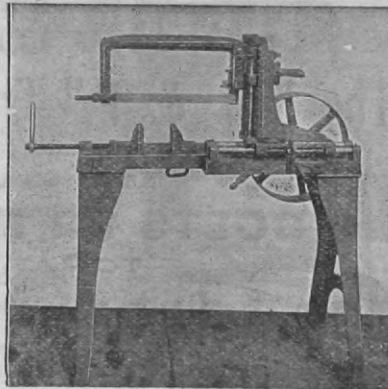
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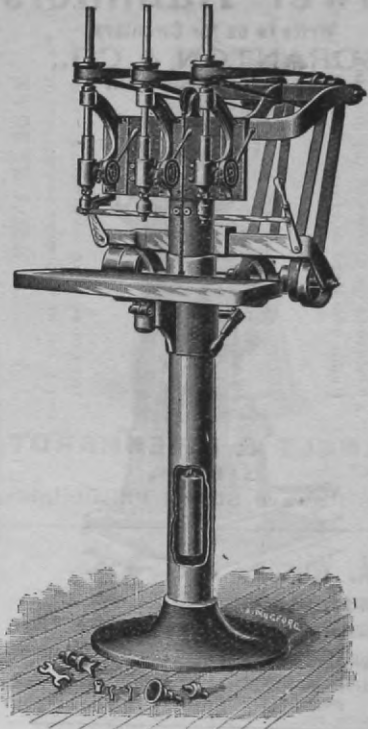
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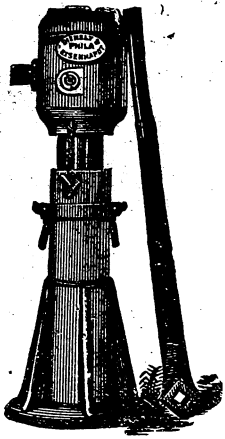
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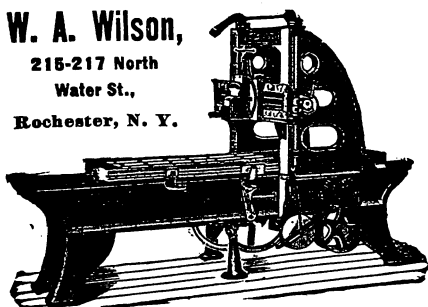
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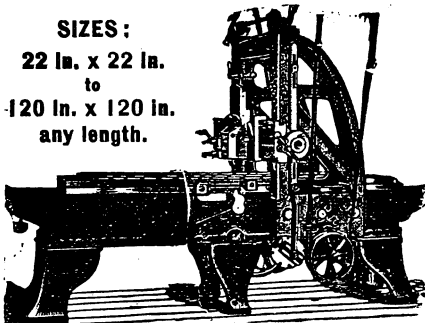
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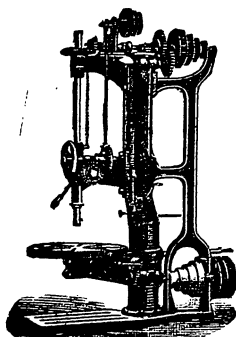
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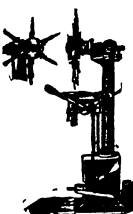
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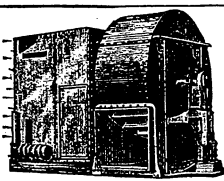
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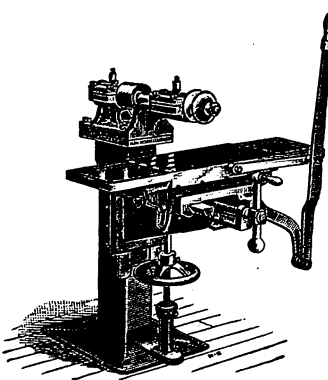
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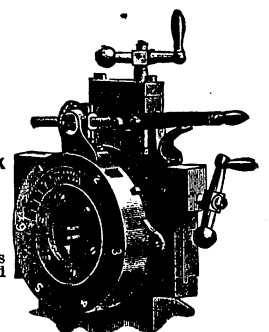
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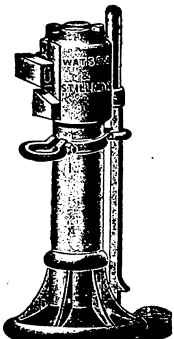
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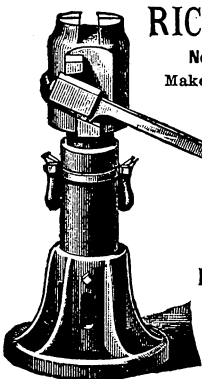
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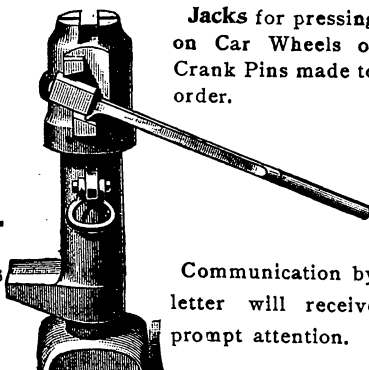


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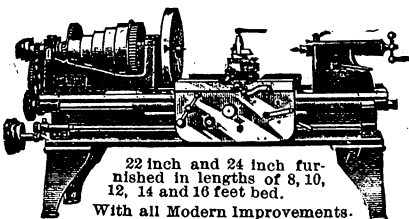
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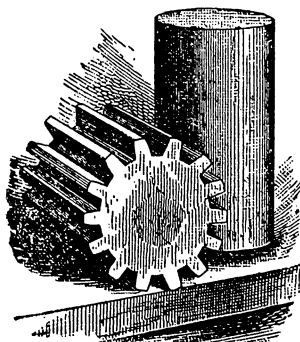


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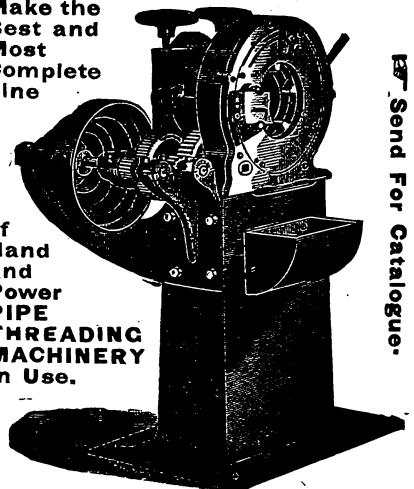
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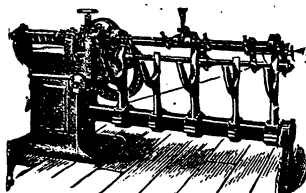
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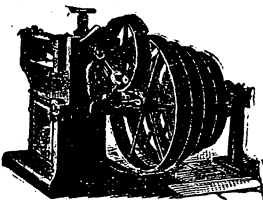
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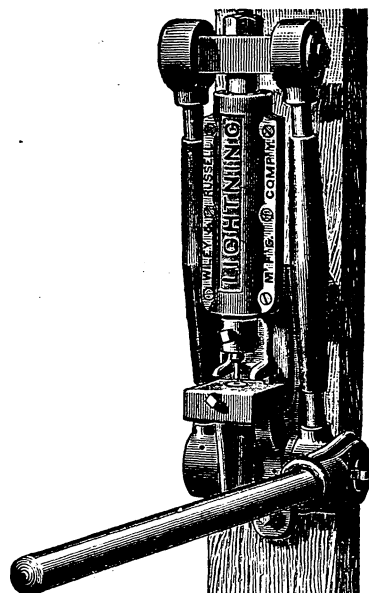


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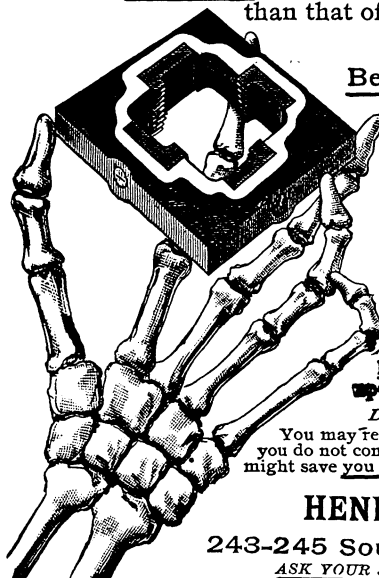
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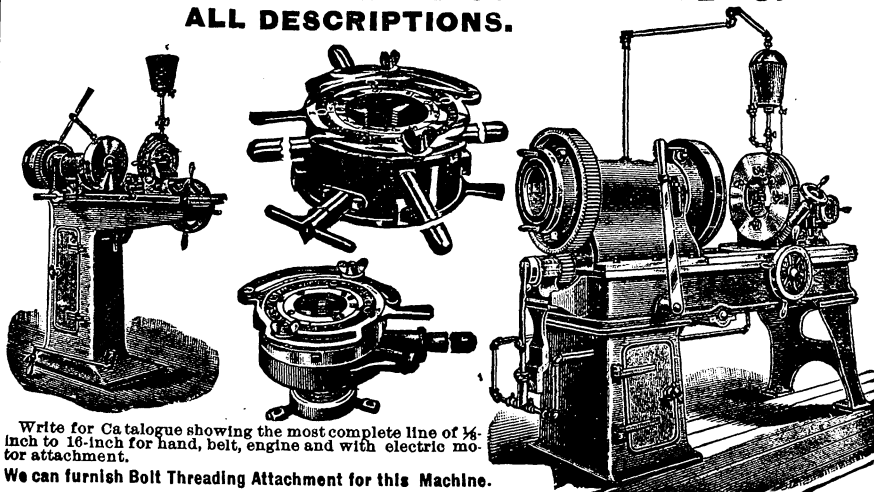
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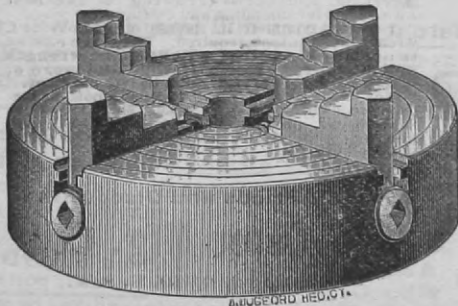
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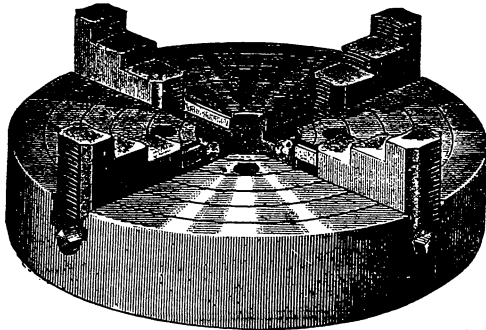
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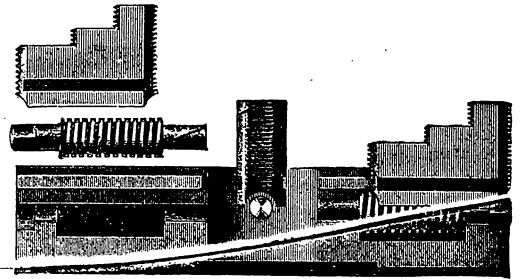
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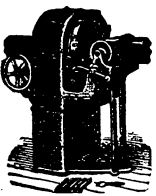


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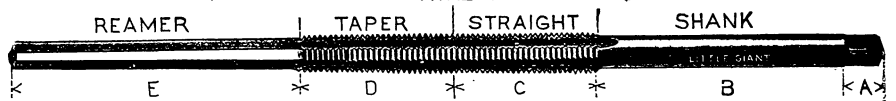
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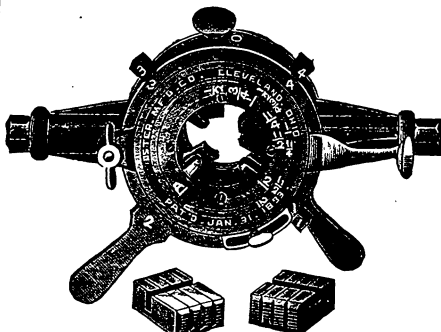
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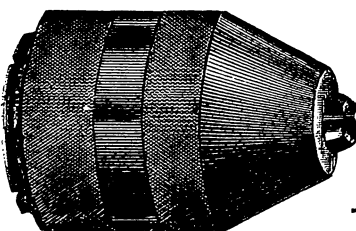


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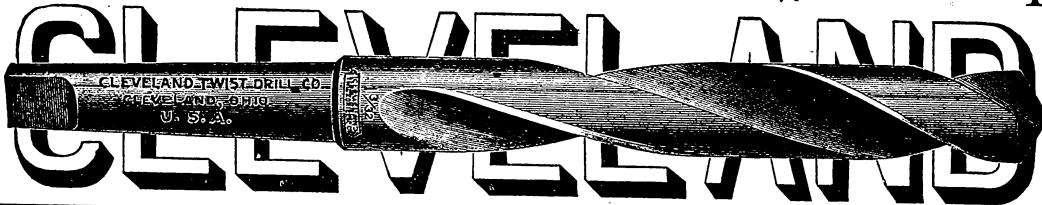
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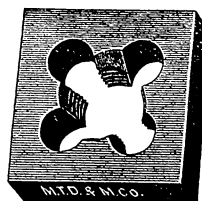
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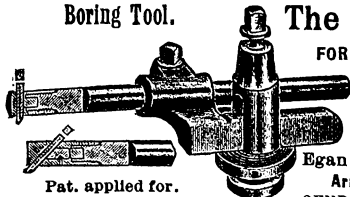
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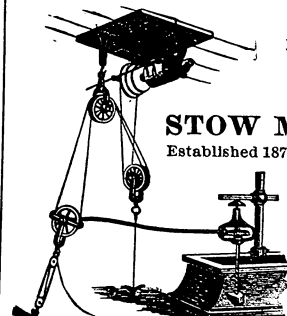
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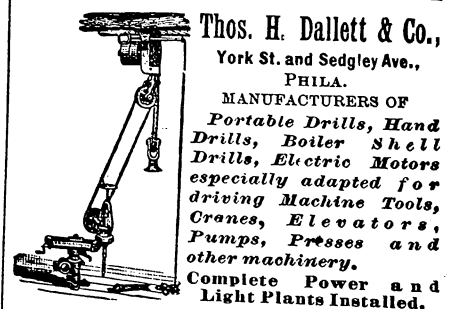
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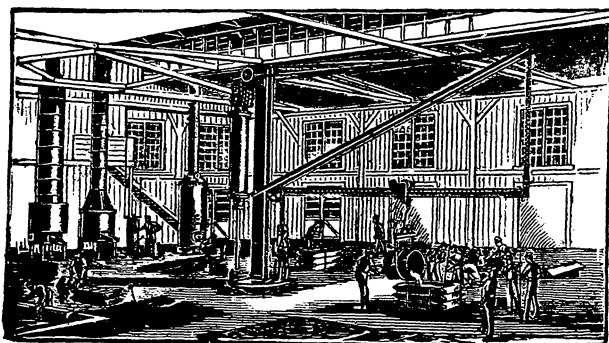
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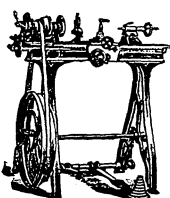
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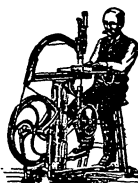
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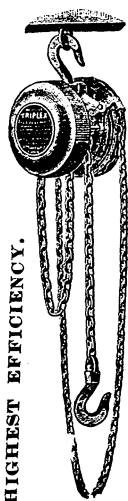
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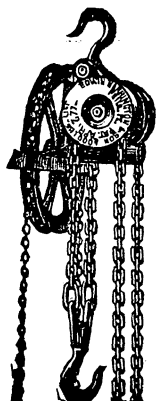
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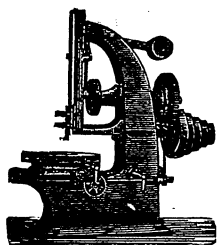
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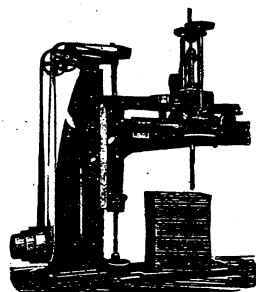
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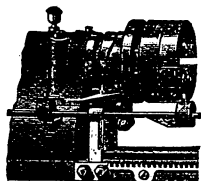
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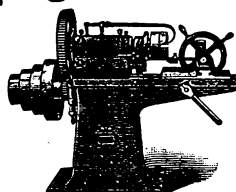
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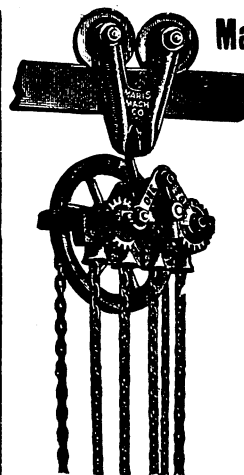
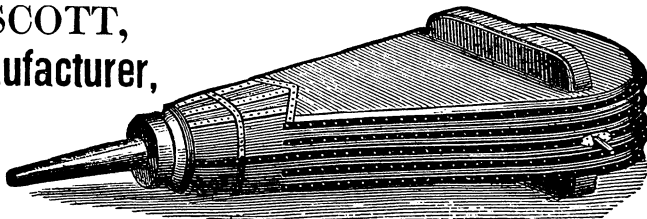
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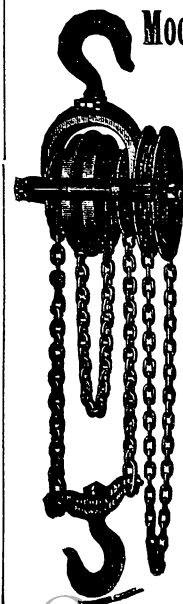
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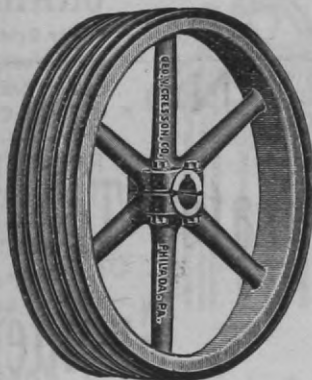
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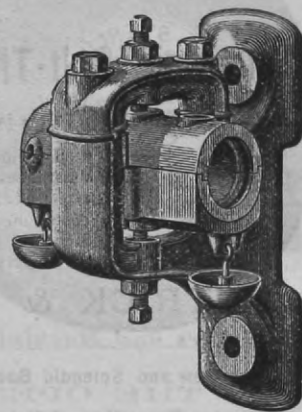
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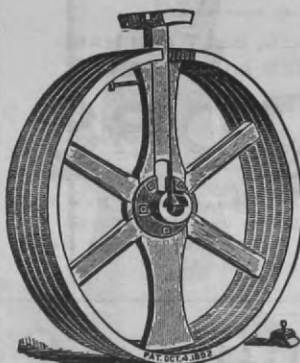
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- III. SOURCES OF CURRENT. CHAPTER III. GALVANIC ELEMENTS; THERMO-PILES; MAGNETO AND DYNAMO-ELECTRIC MACHINES.
- IV. PRACTICAL PART. CHAPTER IV. ARRANGEMENT OF ELECTRO-PLATING ESTABLISHMENTS IN GENERAL; ELECTRO-PLATING ARRANGEMENTS IN PARTICULAR. V. TREATMENT OF THE METALLIC ARTICLES. (a) Mechanical Treatment; (b) Chemical Treatment. VI. PROCESSES OF ELECTRO-DEPOSITION; REDUCTION OF METALS WITHOUT A BATTERY (Electro-Deposition by Contact). VII. DEPOSITION OF NICKEL AND COBALT. 1. Nickelling; 2. Cobalting. VIII. DEPOSITION OF COPPER, BRASS AND BRONZE. 1. Coppering; 2. Brassing (Culverpoll Deposit); 3. Bronzing. IX. DEPOSITION OF SILVER. X. DEPOSITION OF GOLD. XI. DEPOSITION OF PLATINUM AND PALLADIUM. 1. Deposition of Platinum. 2. Deposition of Palladium. XII. DEPOSITION OF TIN, ZINC, LEAD AND IRON. 1. Deposition of Tin; 2. Deposition of Zinc; 3. Deposition of Lead; 4. Deposition of Iron (Steeling). XIII. DEPOSITION OF ANTIMONY, ARSENIC AND ALUMINIUM. 1. Deposition of Antimony. 2. Deposition of Arsenic; 3. Deposition of Aluminium. XIV. GALVANOPLASTY (Reproduction). 1. Galvanoplastic Deposition in the Cell Apparatus; 2. Galvanoplastic Deposition by the Battery and Dynamo Machines. XV. COLORING, PATINIZING, OXIDIZING, ETC. OF METALS. LACQUERING. XVI. APPARATUS AND INSTRUMENTS. XVII. HYGIENIC RULES FOR THE WORKSHOP. XVIII. CHEMICAL PRODUCTS USED IN THE ELECTRO-PLATING ART. XIX. USEFUL TABLES. INDEX.

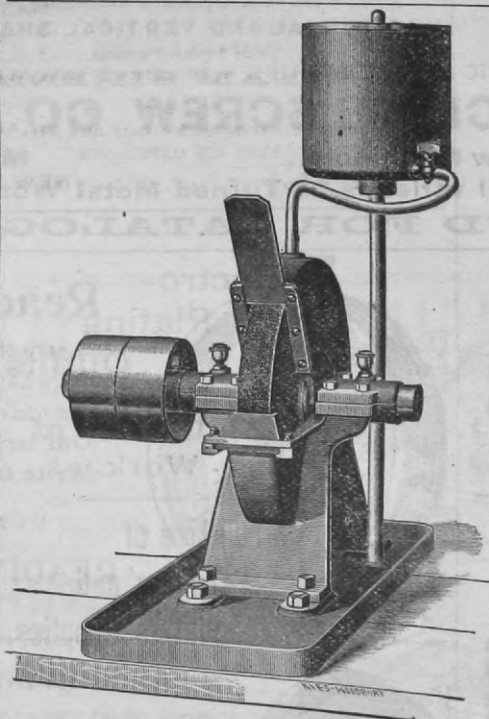
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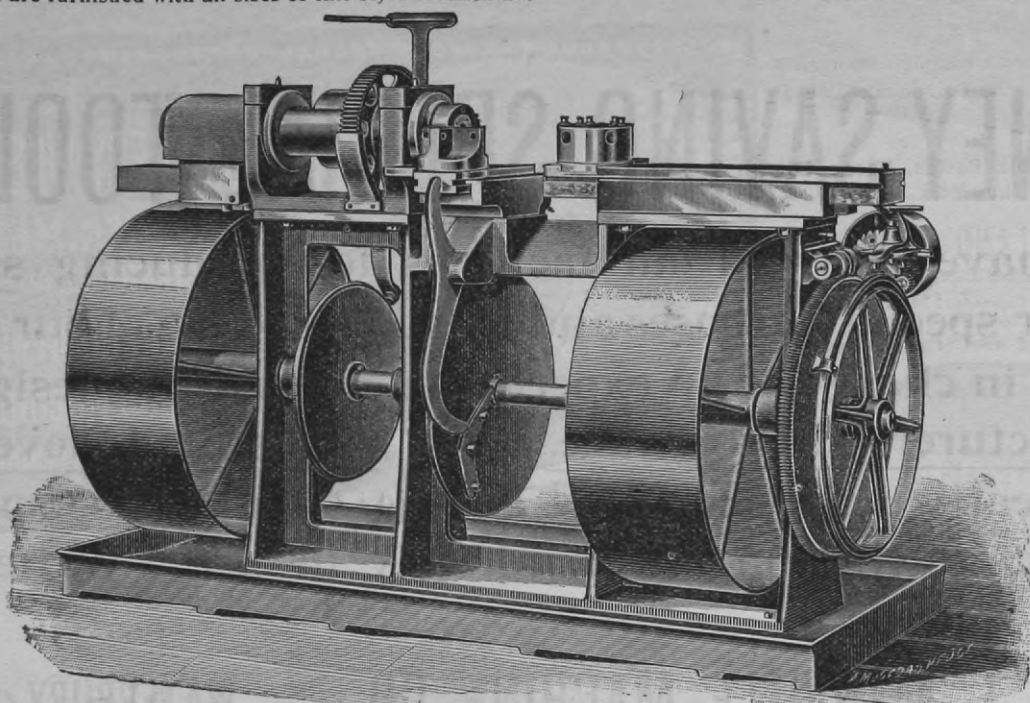


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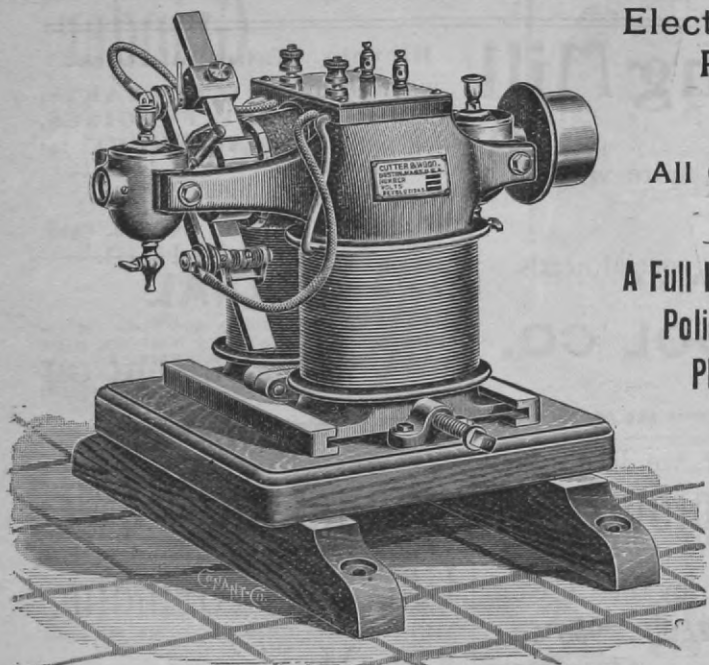
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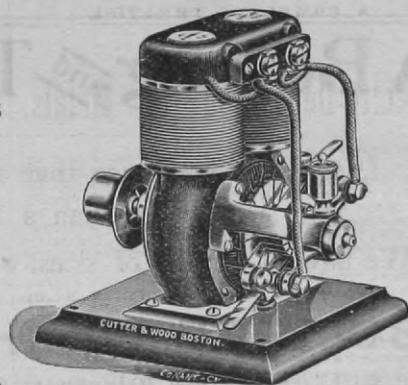
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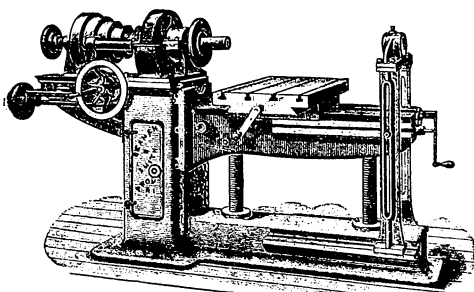
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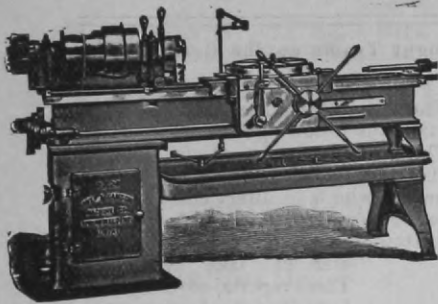
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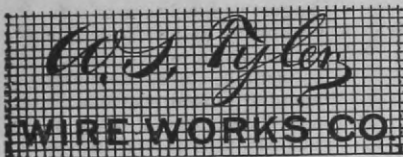
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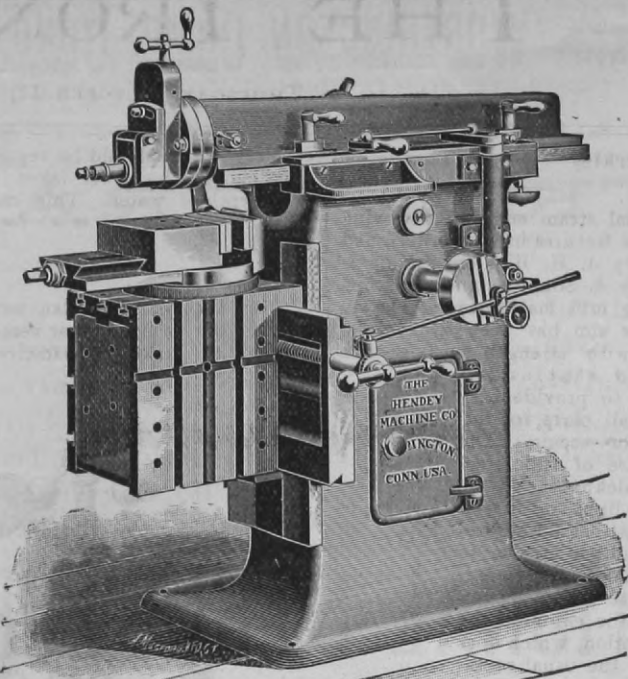
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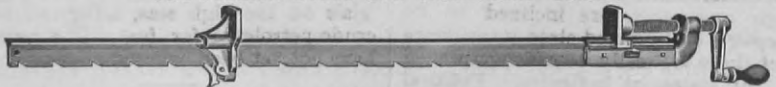
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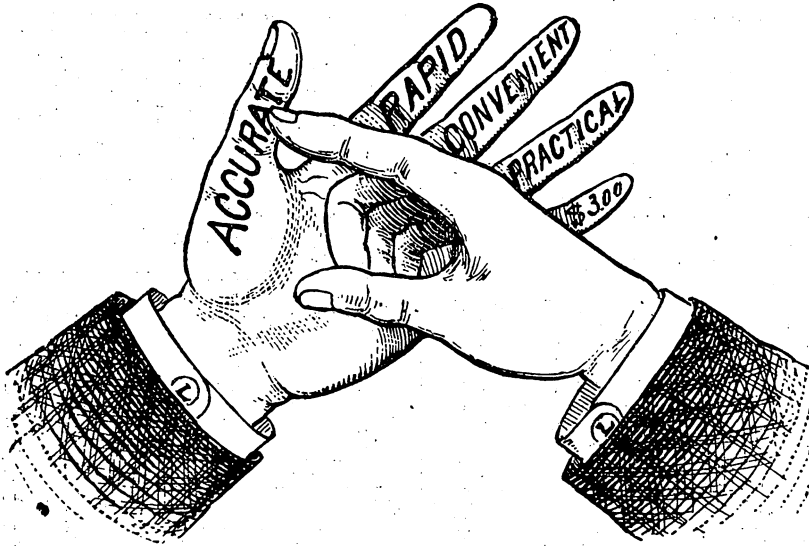
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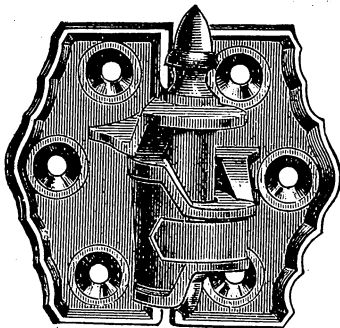
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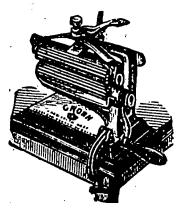
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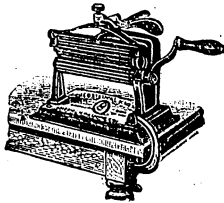
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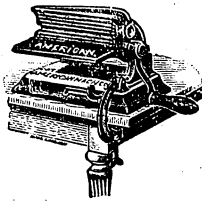
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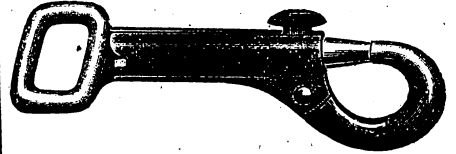
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This snap has many important advantages over other makes of Bolt Snaps, viz.: It is lighter, the spring is entirely covered and protected from foreign substances and freezing, and is lower in price.

Made in all sizes: Round, Loop and Open Eye. We are headquarters and the most extensive manufacturers in Saddlery, Coach and General Hardware Specialties.

Covert's Saddlery Works,  
FARMER, N. Y., U. S. A.

Hardware Dealers  
Can Profitably  
SELL BICYCLES.

There is a large trade in Bicycles in all parts of the country and much of that trade naturally belongs to dealers in hardware. Good bicycles meet with a ready sale and pay a fair percentage of profit.

## COLUMBIAS

Are the representative high grade machines in America. A Columbia is the easiest machine to sell to the best trade because it is unquestionably the standard wheel of the world.

We want enterprising agents of good standing and solicit correspondence.

Pope Mfg. Co.,  
221 Columbus Ave.,  
Boston, Mass.

## MECHANICS

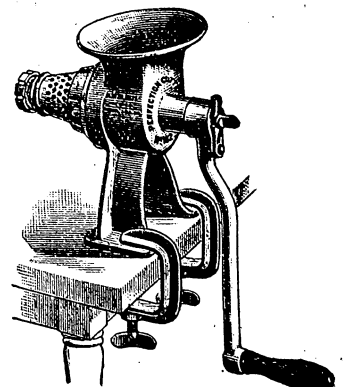


DIPLOMAS AWARDED. Courses in other trades, all including thorough instruction in Mathematics and Physics. Send for FREE Circular, stating subject you wish to study, to The Correspondence School of Mechanics, Scranton, Pa.

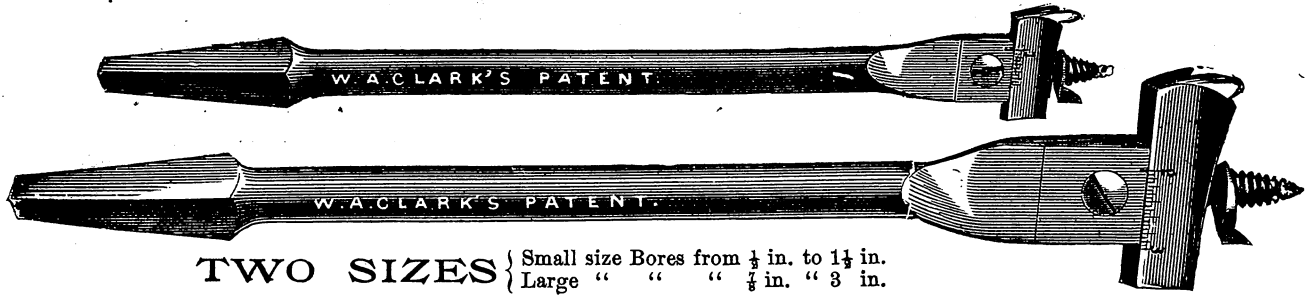
The NEW 1894  
PATTERN  
PERFECTION  
CUTTER.

Improved and Enlarged.

Simple to use.  
Easily cleaned.  
Of few pieces.  
No parts to wear out.



# THE WM. A. CLARK PATENT EXPANSIVE BIT.



**TWO SIZES** { Small size Bores from  $\frac{1}{4}$  in. to  $1\frac{1}{4}$  in.  
Large " " "  $\frac{3}{4}$  in. " 3 in.

**SPECIAL CUTTERS:** No. 5—For Large Bit, Bores from 3 in. to 4 in. No. 6—For Large Bit, Bores from 4 in. to 5 in.

Stock and workmanship superior to all others. Every part interchangeable.

*Quality guaranteed.* For sale by all Hardware Dealers.

Manufactured by **R. H. BROWN & CO.,** New Haven Conn.

*You take no risk on the quality.  
We make only the best!*



**Sand Papers** { Flint Paper  
Garnet Paper  
Emery Paper  
Emery Cloth  
in Reams and Rolls

**HAIR FELTING** for covering Boilers, Steam and Water Pipe, and lining Refrigerators.

**BAEDER, ADAMSON & Co.**

730 MARKET STREET, PHILADELPHIA.  
67 BECKMAN STREET, NEW YORK.  
143 MILK STREET, BOSTON.  
182 LAKE STREET, CHICAGO.

## ROLLER JACK SCREW.



We have experimented much with ball bearing Jacks, and found them very satisfactory when not heavily loaded. Now, instead of balls we put in rollers, as seen in cut. These rollers will stand any load that the Jack will carry, and are not liable to get out of order. We have thoroughly tested these Roller Jacks with a spring balance and find a saving of seventy-five per cent. of power needed to lift a given weight.

The price is about ten per cent. more for Roller Jacks, and the gain is 75 per cent. This ought to insure their sale as fast as the facts become known.

## MILLERS FALLS CO.,

93 READE STREET, - - - NEW YORK.

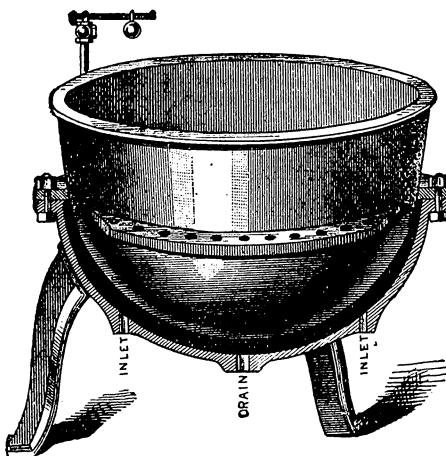
## THE GEM SOLID STEEL MINCER



Single  
and  
Double Blades.

Handle and Blade Formed in one piece.  
Always Clean. Indestructible.  
No Rivets to Wear Loose.  
No Wooden Handle to Shrink, Swell, loosen,  
Split, or Fill with Rancid Grease.

MANUFACTURED BY  
**PALMER HARDWARE MFG. CO.**  
TROY, N. Y.



**Jacketed Kettles.**  
**Jacketed Kettles.**  
**Jacketed Kettles.**

PLAIN AND  
PORCELAIN LINED.

WRITE FOR CIRCULAR.

**THE STUART & PETERSON CO.,**  
BURLINGTON, N. J.  
PORCELAIN LINING TO ORDER.

## BOOKS

THE NEWEST BOOKS ON Iron, Steel and Metallurgy  
Mining, Mechanical and Civil Engineering; Casting and  
Founding; Electricity and Electric Lighting, promptly  
supplied on receipt of price by  
**DAVID WILLIAMS, 98-102 Reade St., New York.**

# CABINET LOCKS

OF EVERY KIND.

DRAWER LOCKS,

CUPBOARD LOCKS,

WARDROBE LOCKS,

CHEST LOCKS,

DESK LOCKS.

A complete line of more than 1000 list numbers exclusive of our old and complete line of

YALE CABINET LOCKS.

THE YALE &amp; TOWNE M'F'G CO.,

STAMFORD, CONNECTICUT.

New York. Chicago. Philadelphia. Boston. Pittsburg. San Francisco.

The only question is

## Is it Le Page's?

If it is you have made a sale. HUNDREDS of THOUSANDS of PLEASSED and SATISFIED CUSTOMERS testify to the merits of

~LE PAGE'S LIQUID GLUE.~

If you sell it you do not have to WASTE ANY TIME in answering questions as to its quality.

The people KNOW that LE PAGE'S GLUE is the BEST. They have used it for years and have proved our claims to be true.

It is the only Glue made WITHOUT ACIDS.

A dealer who regards his time as worth anything will not risk losing his CUSTOMERS' CONFIDENCE by trying to sell something which is CLAIMED to be "just as strong" and "just as good as LePage's."

Don't let your customers go to another store for what they want, but **SELL THEM WHAT THEY ASK FOR.**

We can furnish original and attractive advertising matter for "LE PAGE'S GLUE" upon request.

SEND FOR CIRCULARS AND PRICE-LIST.

RUSSIA CEMENT CO, Gloucester, Mass.

NEW YORK OFFICE, 95 Reade and 113 Chambers Streets.

PACIFIC COAST OFFICE, 23 Davis St., San Francisco, Cal.

NEW ADJUSTABLE BENCH LEVEL.

WITH BOUND AND GRADUATED VIAL.

4-6 and 8 inch.



Three Sizes.

MANUFACTURED BY

C. F. RICHARDSON &amp; SON,

ATHOL, MASS.

THE MARTY FRENCH TRAPS FOR RATS AND MICE.

## Great Reduction in Price.

On account of the lower rate of duties under the new tariff we are now prepared to furnish all sizes at greatly reduced prices, which we shall be glad to quote on application.

Remember we are the sole importers of the genuine Trap. All others are flimsy and worthless imitations.

BURDITT &amp; WILLIAMS, Boston, Mass.



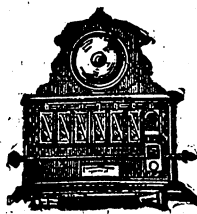
WM. KROGSrud,  
Engraver and Die Sinker,  
61 Fulton St., N. Y.  
Manufacturer of  
**STEEL STAMPS**  
For Every Purpose.  
Steel Letters and Figures.  
Burning Brands, Stencils,  
&c. Send for Illustrated  
Catalogue



## Yacht AND Boat Hardware.

L. W. FERDINAND &amp; CO., BOSTON, MASS.

Send for 226-Page Catalogue.



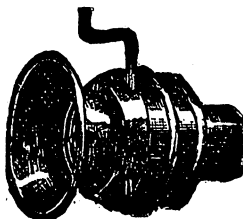
W. R. OSTRANDER &amp; CO.,

204 FULTON STREET, NEW YORK,

Manufacturers of

SPEAKING TUBES, WHISTLES, ORAL, ELECTRIC MECHANICAL AND PNEUMATIC ANNUNCIATORS AND BELLS.

Complete outfits of Speaking Tubes, Whistles, Electric, Mechanical and Pneumatic Bells. A full line always in stock. Send for new catalogue. Factory, DeKalb ave. near Knickerbocker, Brooklyn, N. Y.



# W. & B. DOUGLAS, MIDDLETOWN, CONN.

Branch Warehouses: 85 and 87 John St., New York; 197 Lake Street, Chicago, Ill.

THE OLDEST AND MOST EXTENSIVE MANUFACTURERS OF

## Pumps, Hydraulic Rams, Garden Engines,

Yard Hydrants, Street Washers, Galvanized Pump Chain, Wind Mill Pumps and other Hydraulic Machines in the World.

## DOUGLAS' DIAPHRAGM PUMPS, "Loud Patent."

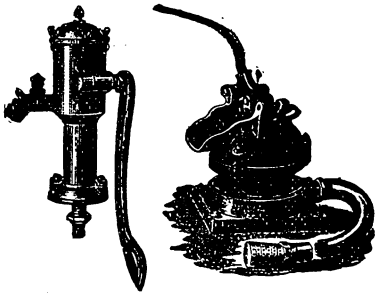
A LARGE CAPACITY AND EASY WORKING PUMP FOR

Water Works, Sewer Contractors, Foundation Builders, Mines, Quarries;

Fig. 209.

Fig. 381.

Fig. 145.



or wherever it is desired to raise a large quantity of water by  
**hand power.**

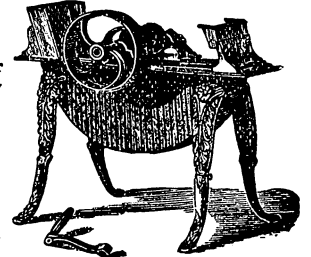
The pump has large valves (accessible by hand), and will pump water containing sand, gravel, sewage matter, &c., without choking or any perceptible wear.

### CAPACITY

from 3,000 to 4,500 gallons per hour.

These pumps are simple, durable and low priced.  
Made either as shown in cut for Hose or for **IRON Pipe Suction** underneath.

Send for Circular and Price List.



C. I. Grindstone Frame.

**THE DEMING CO.**  
FACTORY SALEM O.S.A.  
MANUFACTURERS OF  
HAND & POWER PUMPS, WELL SUPPLIES & C. VERTICAL STEAM PUMPING ENGINES.  
N.Y. OFFICE, 72 JOHN ST.  
HENION & HUBBELL  
GEN'L. WESTERN AGTS.  
55 & 57 N. CLINTON ST.  
CHICAGO, ILL.

## PRENTISS' PAT. VISES.

The Leaders for 20 Years.

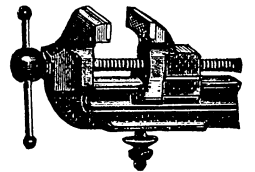
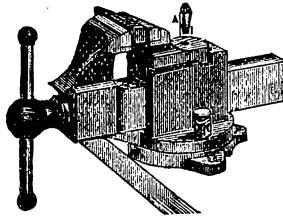
Send for Illustrated Catalogue of

ALL KINDS OF VISES.

PRENTISS VISE COMPANY,

MANUFACTURERS,

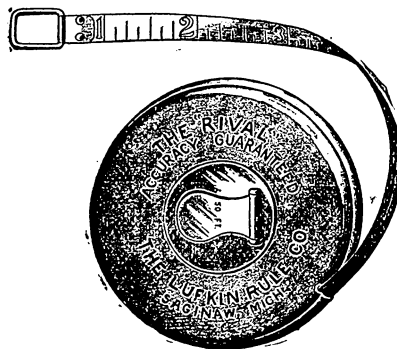
44 Barclay St., New York.



## "RIVAL"

## Steel Measuring Tapes.

Something New! A low priced Steel Tape. First-class and fully guaranteed. Nickel Plated Case. Flush Handle.  $\frac{3}{8}$  in. Tape. Marked one side only. Made 25, 50, 75, 100 feet lengths.



**LUFKIN RULE CO., Saginaw, Mich.**

NEW YORK OFFICE, 2½ MURRAY ST.

## F.E. MYERS & BRO.

**ASHLAND O.**  
+ CATALOGUES FREE +  
Ashland Pump and Hay Tool Works.

The New York Safety Dumb Waiter.  
"The Manhattan Dumb Waiter."  
The Improved Humphrey Hand Elevator.  
Made specially to be sold by Hardware Stores.  
Thousands in use. Catalogues on application.  
**THE STORM MANUFACTURING CO.**  
NEWARK, NEW JERSEY.  
Formerly of Poughkeepsie, New York.

**SPEAKING TUBE ETC.**  
SEND FOR ILLUSTRATED CATALOGUE.  
**J.F. WOLLENSAK**  
CHICAGO, ILL.

**J.F. WOLLENSAK**  
CHICAGO, ILL.  
**THEATRICAL HARDWARE.**  
SEND FOR ILLUSTRATED PRICE LIST.

## MERK CHRISTMAS TREE HOLDER!

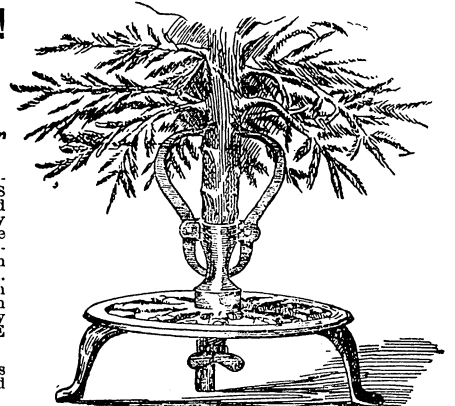
PATENTED SEPT. 1st, 1891.

**BUY THE BEST.**

Christmas comes but once a year

If you want to make your home pleasant and cheerful during the holidays BUY A MERK CHRISTMAS TREE HOLDER. Made of iron, neatly finished in gold bronze or japanned, a great improvement over any heretofore made. By an ingenious contrivance the tree is held secure by strong arms which extend upward from the main body of the receptacle in which it is placed. If desired the tree can be revolved. Sample tree holders sent by express prepaid upon receipt of \$1. Packed in quarter and half dozen crates for shipment. Manufactured and sold only by the **ALLEN TOWN HARDWARE WORKS, ALLENTOWN, PA.**

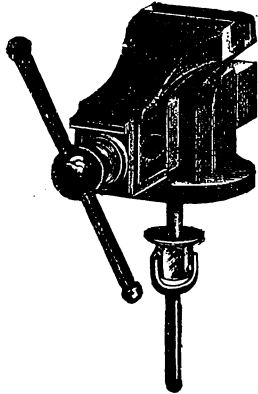
SOMETHING NEW.—Hardware dealers and others are requested to write for descriptive circulars and wholesale prices.







**Athol Machine Co.,**  
Selling Agents.



**HOLLANDS'  
OFFSET JAW  
VISE.**

Specially adapted  
for drill press work  
where chucks can-  
not be used and  
equally good for  
special or regular  
bench work.

**Hollands Mfg. Co.,**  
ERIE, PA.,  
Manufacturers all  
styles VISES.

**Red Jacket  
Mfg Co.**

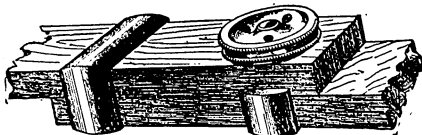
DAVENPORT  
IOWA, U.S.A.

Manufacture the  
**Only Pump**

in the U. S.  
that works easily in  
wells of any depth, and  
can easily be fixed by  
any one with a monkey  
wrench without taking  
the pump from  
well or tearing up the  
platform.

WRITE FOR PRICES.

**Chas. Millar & Son,**  
General Eastern Agts.,  
UTICA, N.Y.



Extension Rules and Hardware Specialties  
Send for Catalogue.  
**RANSON HARDWARE CO., Burlington, Vt.**

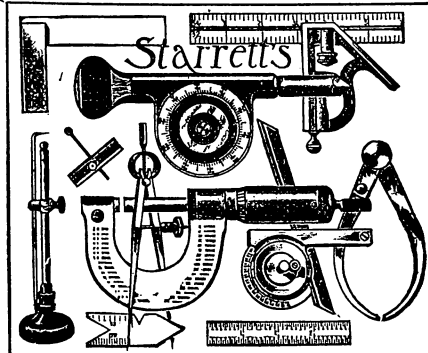
**CHAS. W. HOEFIC,**  
ENGRAVER AND DIE SINKER,  
52 FULTON ST., - N. Y.  
**STEEL STAMPS,**  
BRASS DIES, BURNING BRANDS, &c.  
Designs on Steel Finely Executed.

Skilled mechanics prefer them

Live dealers sell them

**STARRETT'S**

Best  
in  
work-  
manship  
Finest  
in  
finish  
Latest  
in  
improve-  
ments



For  
all  
workers  
in  
metal  
or wood  
Every  
tool  
warranted  
satisfac-  
tory

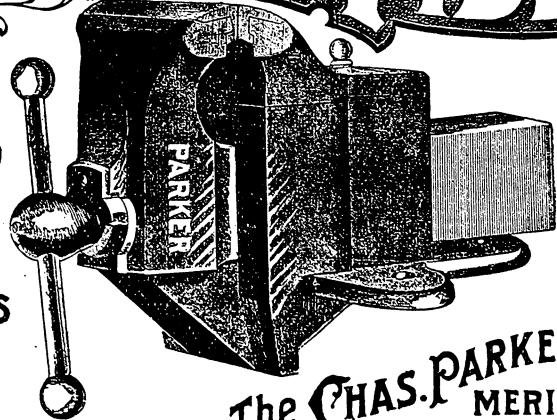
**FINE TOOLS**

Send for Catalogue

L. S. Starrett, Athol, Mass.

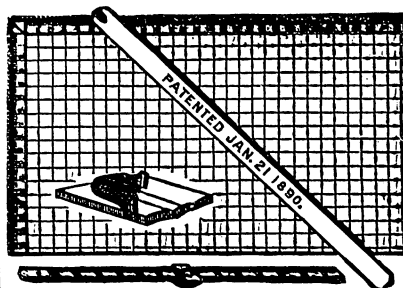
**PARKER VISE**

*HAS STOOD  
THE TEST  
OF OVER  
FIFTY YEARS*



**The CHAS. PARKER CO.**  
MERIDEN,  
CONN.

This is a fac-simile of an 11x15 inch show  
card in gold and colors which is attractive in  
every hardware store. We will mail one to  
any hardware dealer who will place it con-  
spicuously in his store.



**The Canton Glass Board.**

Cuts any Fraction of an Inch by Eighths.

Unequaled for accuracy and quick work in out-  
ing square or at any angle. Saves breakages, &c.

—ALSO—

**IMPROVED TRAMMEL RULE for Cutting Circles**

From 3 inches up to 48 inches, Segments,  
Gothic Shapes, &c.

Send for Circular.

**The Canton Saw Co., Canton, Ohio.**

F. B. EARLE, Sec.

## OPERATING

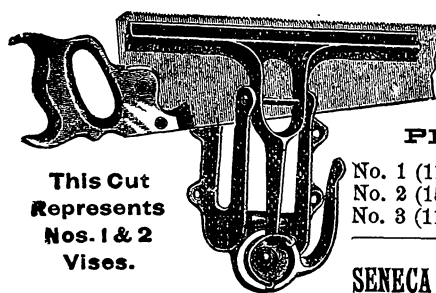
**SEND FOR PRICE-LIST.**

**GENERAL OFFICE :**  
**NEWARK, - - New Jersey,**

# SAWS

**WITH RUBBER CUSHIONED JAWS.**

*Will make no more noise than Filing on a Solid Piece of Iron.*



**This Cut  
Represents  
Nos. 1 & 2  
Vises.**

PRICE LIST.		LIBERAL DISCOUNT TO THE TRADE.
1 (11 inch Jaws),	PER DOZ. \$15.00	LONGEST JAWS, HEAVIEST AND BEST FINISHED. Sold by all leading jobbers of general Hardware at Factory Prices.
2 (15 inch Jaws),	21.00	
3 (11 inch Jaws),	18.00	

—MANUFACTURED BY—

**SENECA FALLS MFG. CO., 255 Water St., Seneca Falls, N. Y.**



### No. 3 Vise.

**BRANCH HOUSES:**  
**Memphis, Tenn.**  
**Minneapolis, Minn.**  
**Chattanooga, Tenn.**

## Circular, Band, Cross-Cut and Hand Saws.

**Diamond.  
Rex.  
American.**

**Dexter.**  
**Lance.**  
**Columbian.**



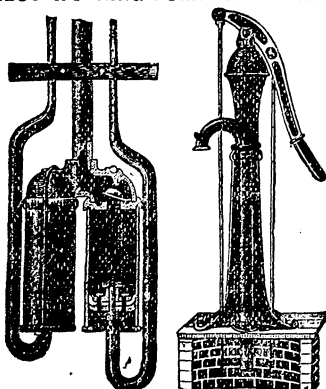
# ATKINS

# ATKINS



**Write for Price-List and Trade Prices.**

**Peters Double Cylinder  
Force Pump.**  
**EASIEST WORKING PUMP IN THE MARKET.**



**Will send any responsible dealer a sample to be returned in 30 days if not perfectly satisfactory.**

WRITE FOR CIRCULARS AND PRICES.  
PETERS PUMP CO., - KEWANEE, ILL.

**THE SIMMONDS**

**SAWS**

**KNIVES**

**AND**

**WE MAKE**

**SOLID TOOTH AND INSERTED POINT**

**CIRCULAR SAWS**

**STRAIGHT SAWS SUCH AS**

**GANG, MILL, MULAY AND**

**DRAW SAWS AND THE CRESCENT GROUND CUT**

**BAND SAW FROM ONE EIGHTH INCH TO TWELVE INCHES WIDTH**

**OF SCROLL SAWS WE ARE THE LARGEST MANUFACTURERS OF MACHINE KNIVES IN THE WORLD**

**WE MAKE EVERYTHING IN THE SHAPE OF A SAW OR KNIFE**

**OUR ADDRESSES ARE**

**SIMMONDS MFG. CO.**

**ST. LOUIS, MO.**

**CHICAGO, ILL.**

**ST. FRANCISCO, CAL.**

**PORTLAND, OREGON.**

**SELLING AGENCIES**

**L.A. KIMBALL 107 LIBERTY ST.**

**NEW YORK CITY**

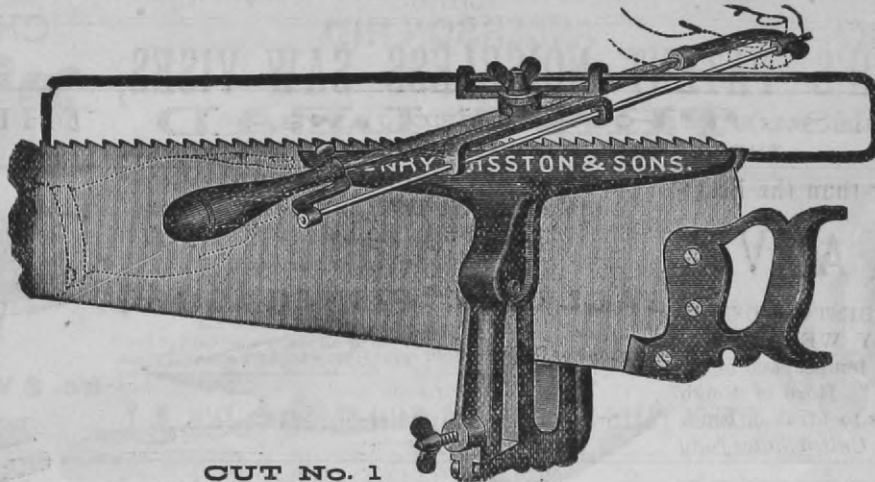
**SIMMONDS MFG. CO. LTD.**

**23 MAGAZINE ST.**

**NEW ORLEANS, LA.**

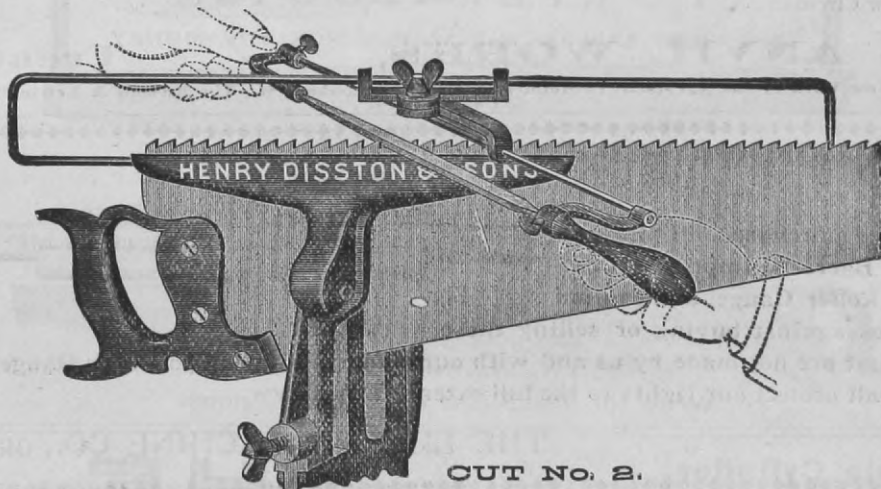
# DISSTON'S Improved Saw Clamp AND FILING GUIDE.

ESPECIALLY DESIGNED TO ASSIST THOSE NOT SKILLED IN THE ART  
OF SAW FILING TO FILE A SAW CORRECTLY.



CUT No. 1

Cut No. 1 shows a saw and the attachment in proper position for filing the first side, and Cut No. 2 shows the saw and attachment reversed and in position to file the second side. There are three marks on one of the hubs of the swivel attachment, and one mark on the other. One of the three marks shows when it is in position No. 1, and the other designates when it is in position as shown in No. 2. The third, or centre, marks show when it is in position for filing Rip Saws.



CUT No. 2.


To obtain the correct position, loosen the wing nut and move the guide around to the point desired; after tightening wing nut, loosen screw in file handle, then turn handle until file gives the shape tooth wanted.

A good way is to select a tooth of correct shape and let file down into it, tighten set screw in handle, then file a tooth to see if the shape suits. If not turn the file a little to the right or left and try another tooth until the proper shape is obtained. Then file every other tooth, see cut No. 1; when one side is filed, reverse saw and attachment and adjust as in No. 2, and file the other teeth. For Rip Saws, place the file at right angles with the saw and file every tooth. Always keep the file as nearly horizontal as possible.

This filing guide is sold only attached to our No. 3 Improved Clamp or Vise, and not sold separately. We recommend this as the best saw clamp on the market, being quickly and easily adjusted, and not liable to get out of order.

Write for price including No. 3 Clamp, Filing Guide, File and Handle complete; Packed one in a wooden box.


**Henry Disston & Sons, Philadelphia, Penn.** INCORPORATED.




**ARCADÉ FILE WORKS**

**WARRANTED FILES AND RASPS.**

EASTERN OFFICE.  
NEW YORK.



WORKS,  
ANDERSON, IND.



WESTERN OFFICE.  
CHICAGO.

THE FILES **THAT LEAD** THEM ALL  
THE BEST EQUIPPED FILE WORKS IN THE WORLD.

Warranted Better than the Best

## ENGLISH ANVIL

Face in one piece of BEST TOOL CAST STEEL, PERFECTLY WELDED, perfectly true, of hardest temper, and never to come off or "settle." Horn of tough untempered steel, never to break or bend. Only Anvil made in the United States fully warranted as above.

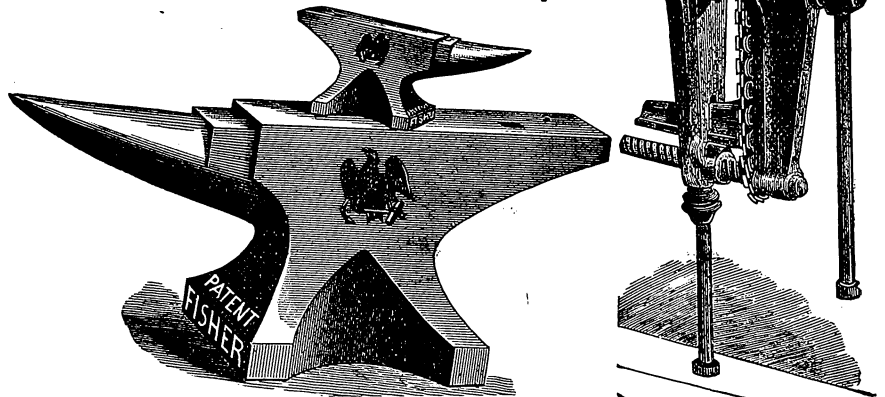
## FISHER DOUBLE-SCREW VISE

IS FULLY WARRANTED STRONGER THAN ANY OTHER LEG VISE, AND ALWAYS PARALLEL. Is the best Vise for Machine Shops and Blacksmiths, and for all heavy work. ACCURATE AND DURABLE. Send for Circular.

ESTABLISHED 1843.  
MORE THAN 200 DIFFERENT PATTERNS.

None Genuine without our Trade-Mark.

**EAGLE and "FISHER" Stamp.**



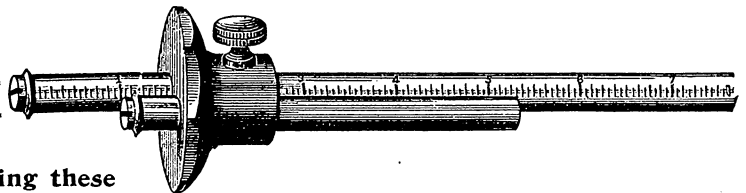
**EAGLE ANVIL WORKS,**

**Trenton, N. J.**

Sold in New York by our Agents, J. C. McCarty & Co., 97 Chambers St., The Russell & Erwin Mfg. Co.  
45 Chambers St.

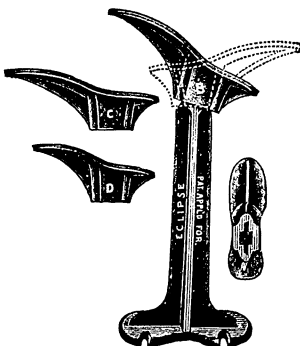
## CAUTION!

We have purchased all the patents of Barret's Improved Combination Roller Gauge, and caution all parties against buying or selling these Gauges that are not made by us and with our name stamped upon each Gauge. We are able to and shall protect our rights to the full extent of the law



THE LEAVITT MACHINE CO., ORANGE, MASS.

## Eclipse Shoe Stands and Lasts.



Reversible and Common Shoe Lasts.

Lap Lasts, Shoe Rests, &c., &c.

Patented May 1st, 1894.

For Prices and Circu'ars address

**John C. Kupferle,**

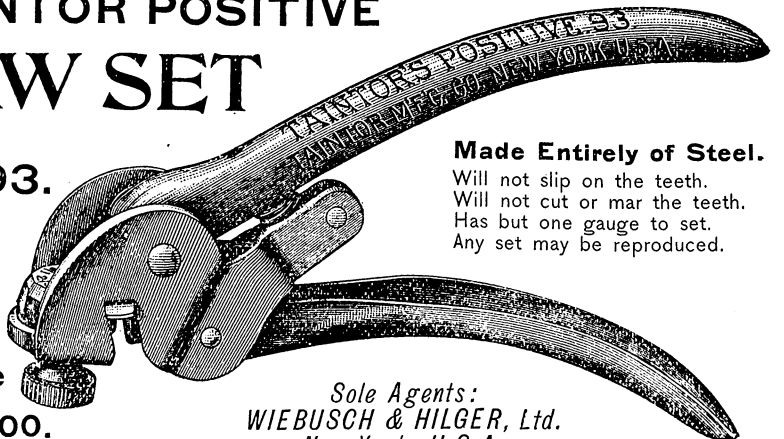
**ST. LOUIS, MO.**

## TAINTOR POSITIVE SAW SET

No. 93.

Retail

Price  
\$1.00.

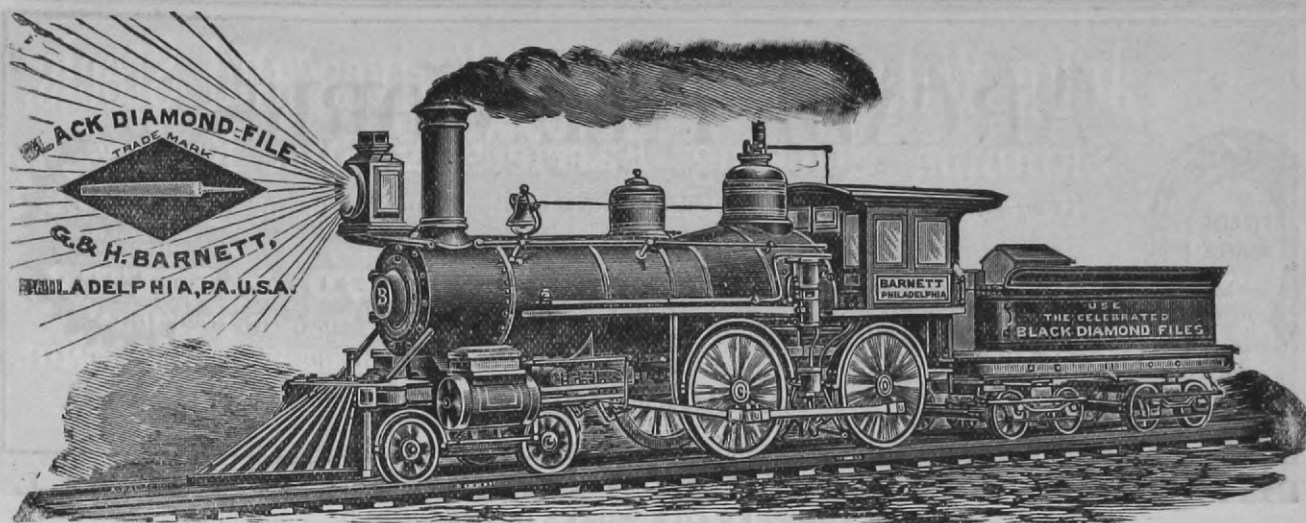


Made Entirely of Steel.

Will not slip on the teeth.  
Will not cut or mar the teeth.  
Has but one gauge to set.  
Any set may be reproduced.

Sole Agents:  
**WIEBUSCH & HILGER, Ltd.**  
New York, U.S.A.





THE LARGEST AND MOST COMPLETE FILE WORKS IN THE WORLD.

**NICHOLSON FILE CO.**  
PROVIDENCE, R. I.

3000  
VARIETIES FILES  
[X.F.] AND INCREMENT CUT FILES

**J. M. KING & CO.,**  
WATERFORD, N. Y.

Manufacturers of  
**BUTTON'S**



**Pat. Wire Cutter  
AND PLIER COMBINED.**

Specially Adapted for Use on Wire Fence.

Also Manufacturers of BLACKSMITHS' and MACHINISTS' STOCKS and DIES, PLUG and TAPER TAPS, HAND, NUT and SCREW TAPS, PIPE TAPS and REAMERS.

Price-List on Application.

Established by DANIEL B. KING, 1829.

Philadelphia, 1876.



**McCaffrey File Co.,**  
FIFTH and BERKS STS.,  
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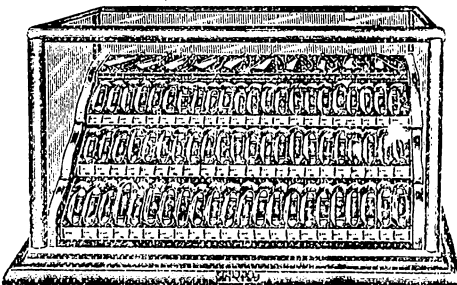


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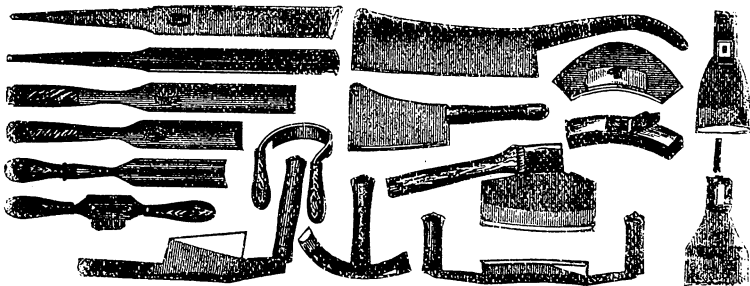
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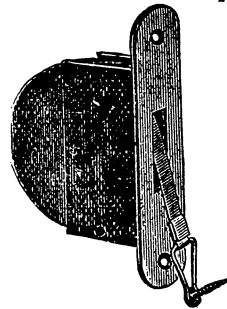
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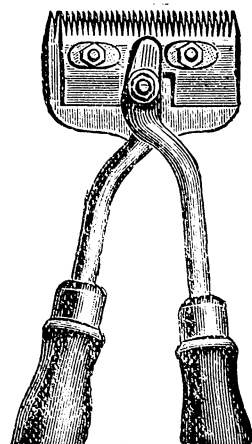
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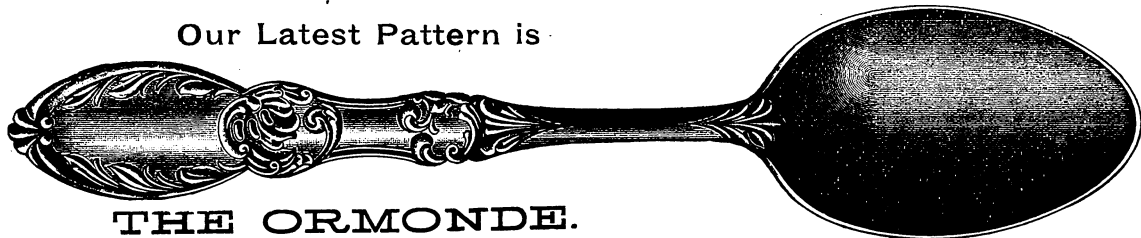
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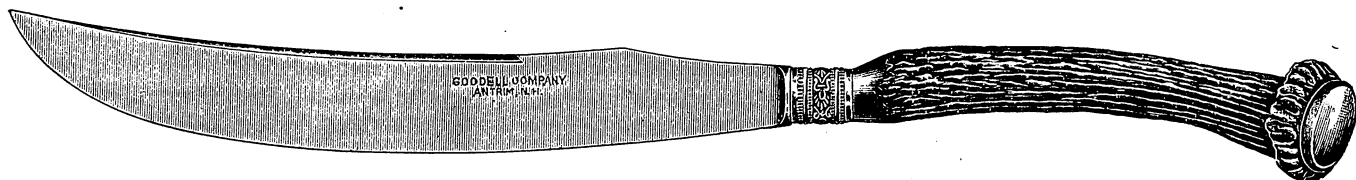
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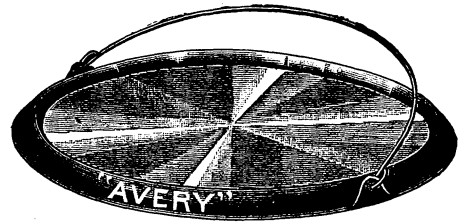
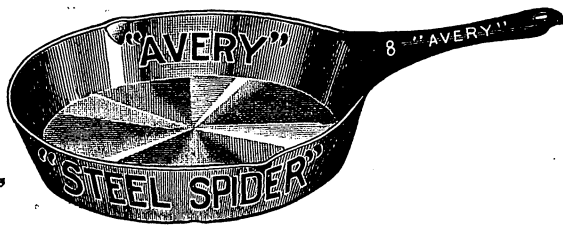
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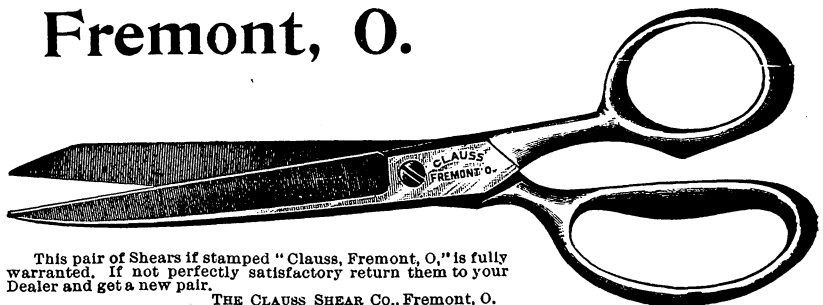
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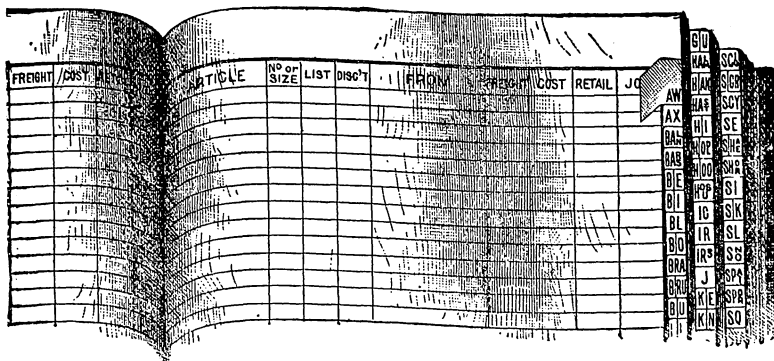


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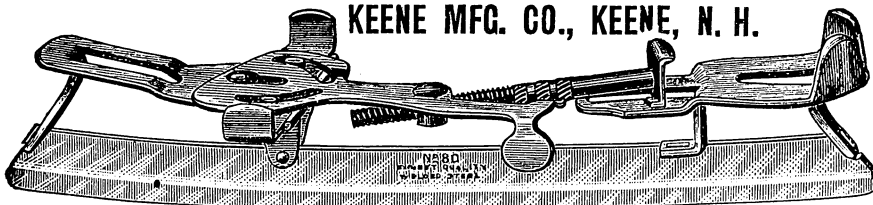
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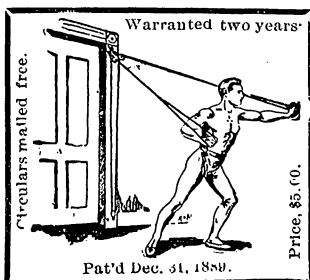
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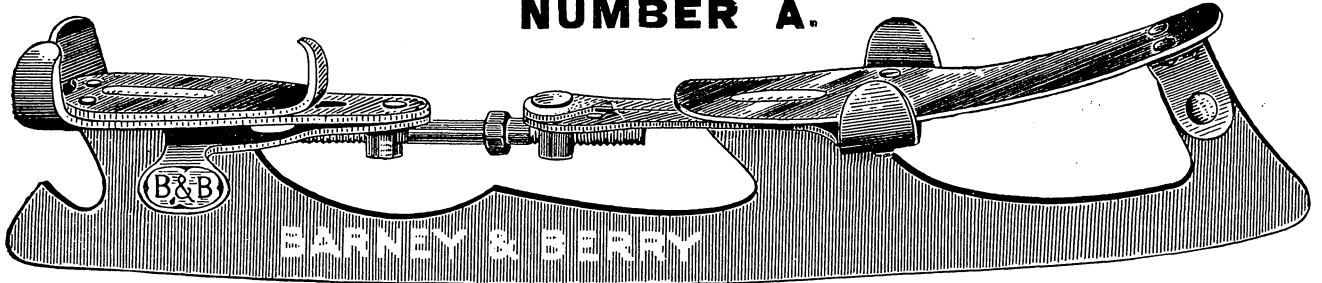
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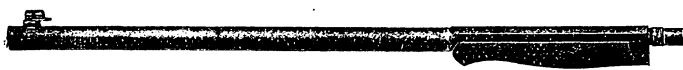
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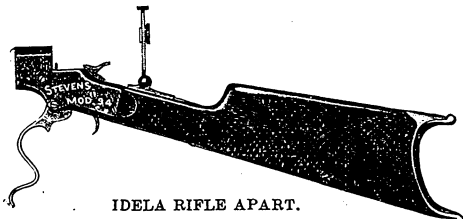
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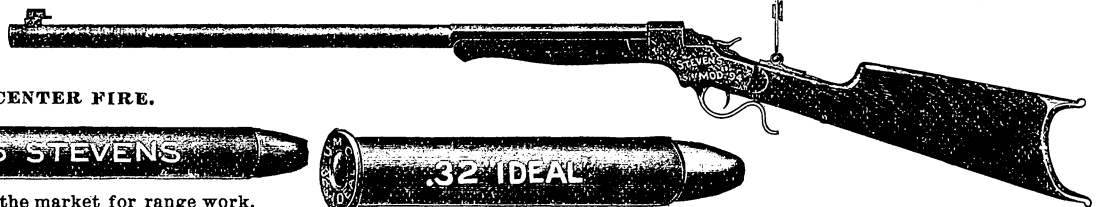
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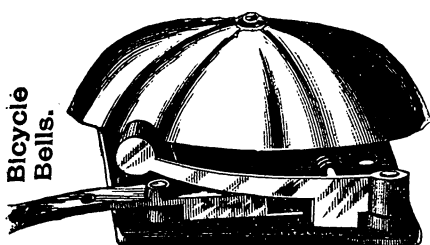
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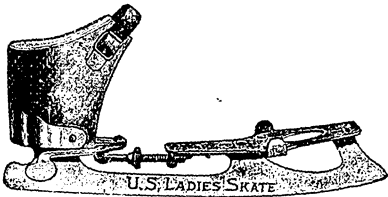
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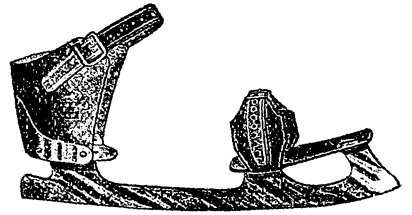


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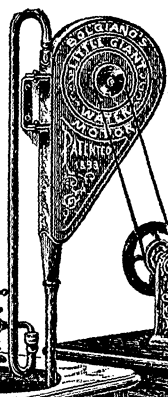
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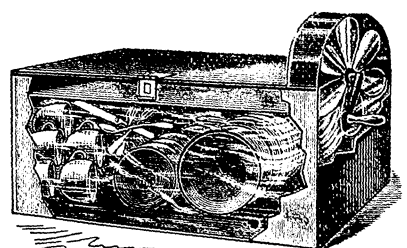
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WASHES CLOTHES  
IN 15 MINUTES.  
New Steam Clothes Washer, 50c.

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Consumed While Cooking.  
NEW STOVE PIPE ODOR  
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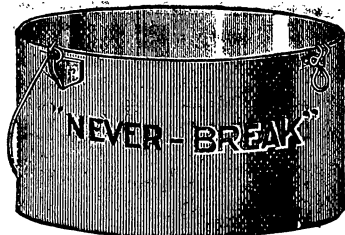
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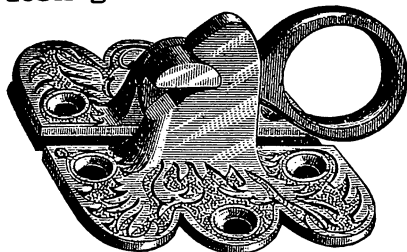
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Refrigerator Door Fasteners

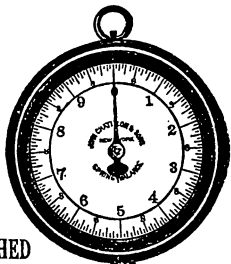
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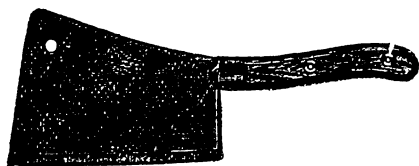
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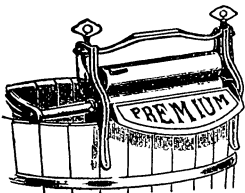
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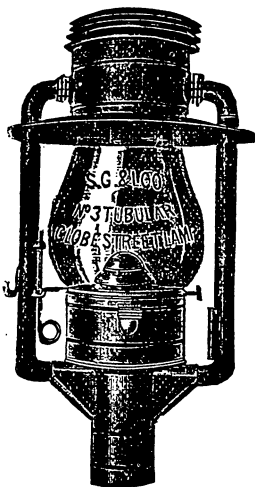
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"New Process"  
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THE HEATING PROBLEM SOLVED AT A SMALL COST.

The "New Process" (Coal) Oil Heater will comfortably heat a room twenty feet square, in cold weather. Is intended for use in Bed-rooms, Bath-rooms, Dining-rooms, Offices, Summer Resorts and all places where a moderate heat is required, without a flue connection.

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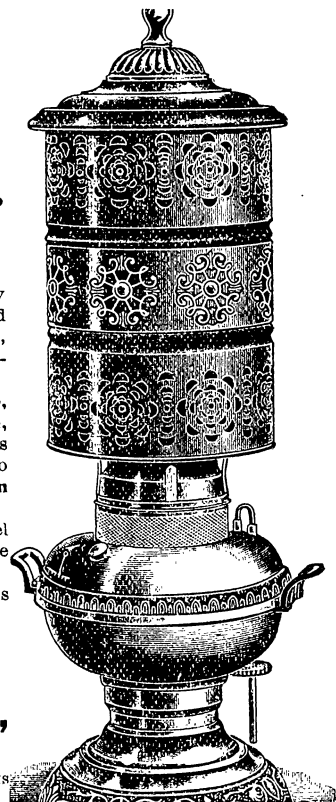
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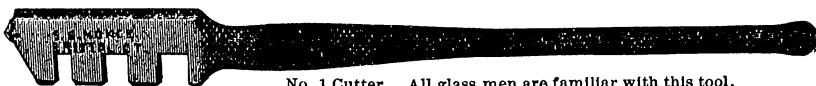
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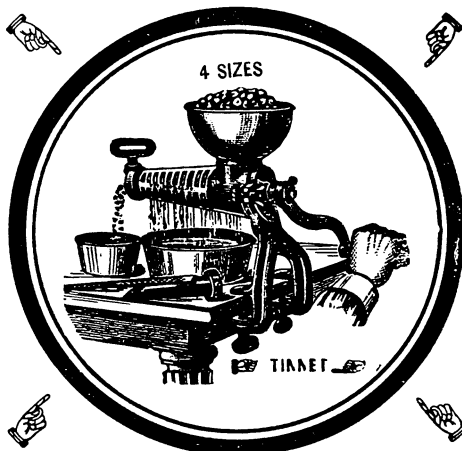
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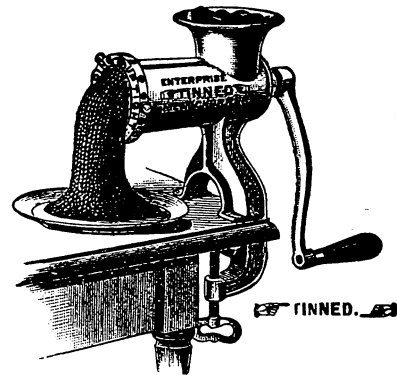
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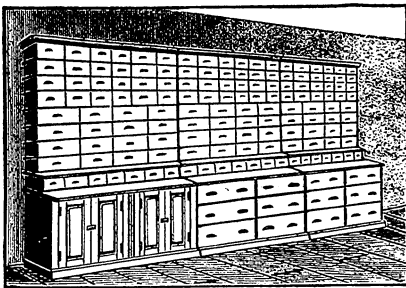
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It is new, novel and unequalled for beauty  
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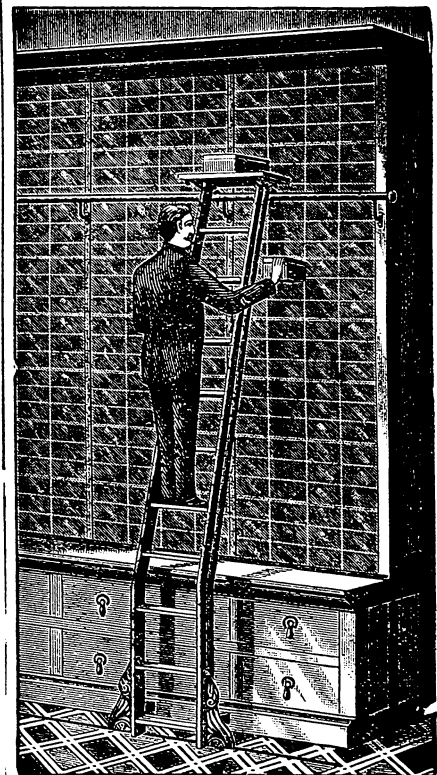
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Especially adapted for Hardware Stores.

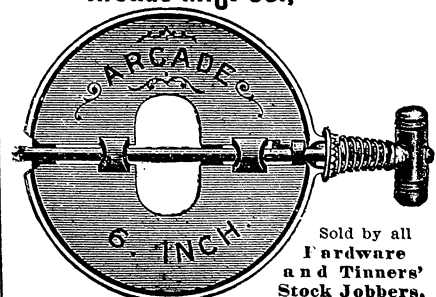


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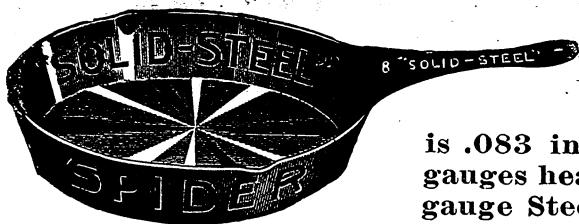
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Made by **Arcade Mfg. Co.,** Freeport, Ill.



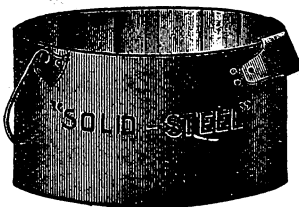
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No Seams, no Rivets in "Solid-Steel" Ware.

Our Spiders and Griddles are made from No. 14 Stubbs gauge steel, which is .083 in. thick, and which is two gauges heavier than No. 14 American gauge Steel.

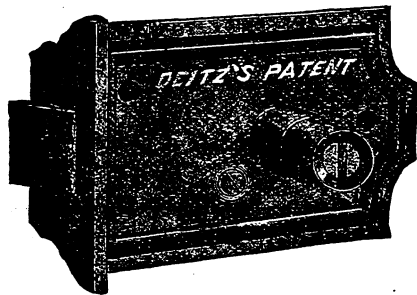


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**The Cleveland Stamping & Tool Co., Cleveland, O.**

**We do Light and Heavy Stamping and Blanking. Also build Dies and Stamping Machinery.**

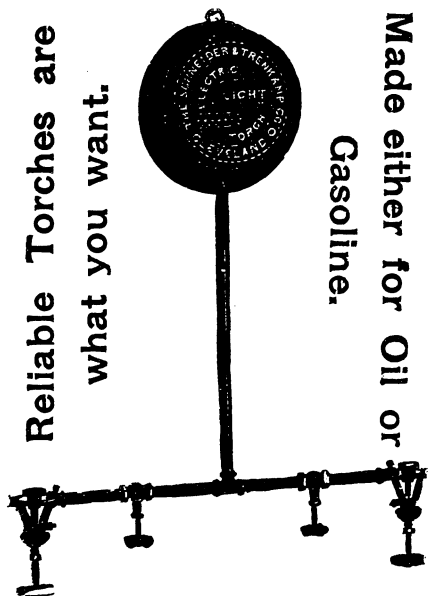
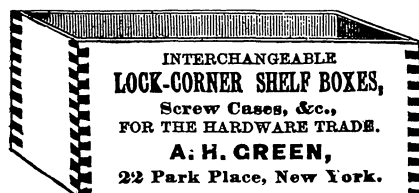
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**Factory, BROOKLYN, E. D., N. Y.**

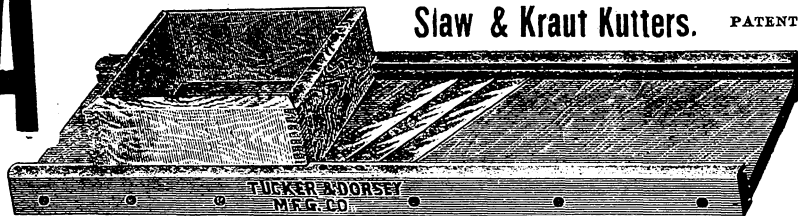


These Torches are particularly adapted for use in Factories, Foundries, Machine Shops, Rolling Mills, Blacksmith Shops, Warehouses, &c. They make a strong white light, are free from smoke and are not affected by wind or rain. They are convenient and portable. These Torches can be run at an expense of about one-half cent to one cent per hour, burning a bright, steady light which is ten times greater than the light of an ordinary gas burner.

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Slaw &amp; Kraut Cutters. PATENTED.

A line that leads them all. Get our new prices.  
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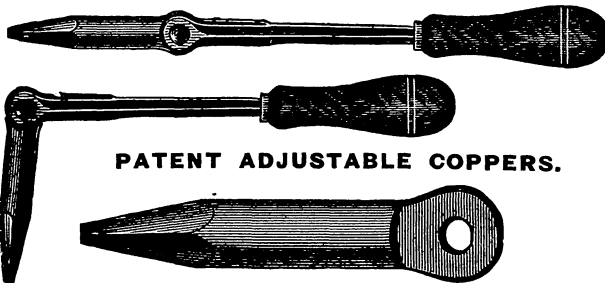
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**American Shear Co. Knives.**

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## Covert Pat. Adjustable Soldering Irons and Coppers

It is a complete tool in every respect, and can be as easily adjusted at angle while hot as cold. The handle can be used indefinitely, as when the copper is worn out it can be replaced in the same handle, making the iron as good as new at about half the cost of the ordinary soldering iron.

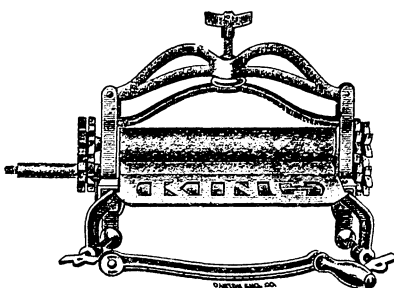


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A sample of  $\frac{3}{4}$  in. soldering iron will be sent by mail, free of postage to any address, on receipt of sixty cents (60c.).

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Manufacturers of **SAD IRONS AND HARDWARE.**



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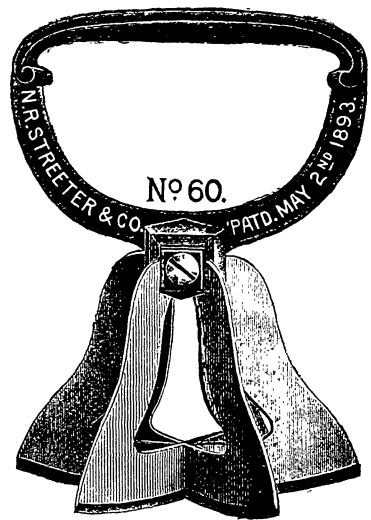
Tempered Steel Nickel-Plated Blades.  
Multiple-Bladed Means Rapid Cutting.

These goods have become the  
standard of the market.

Our line of Sensible Mincing Knives  
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BLADES can be REMOVED when they  
need sharpening. Easy to clean.

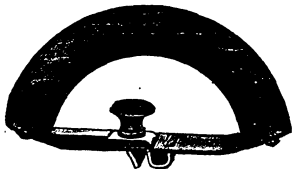
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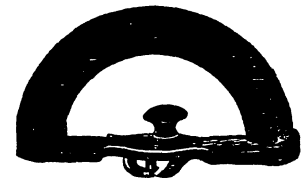


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The Steel Stretcher Handle,  
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in Hazel Wood only.  
No. 110.

The Cleveland Wood Turning Co.,  
710-726 Scranton Ave., Cleveland, O.

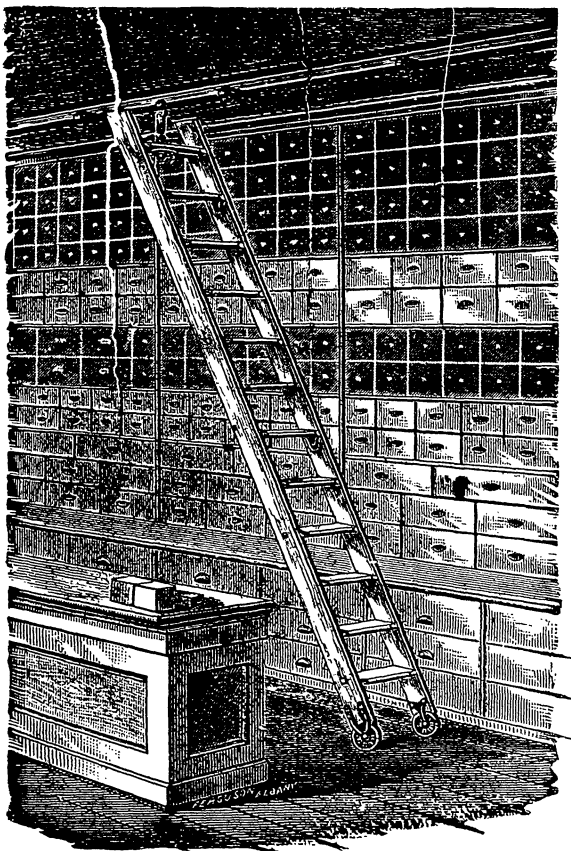
Special work in Handles and Wood Turning of all  
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Hazel, Tinned, No. 20.

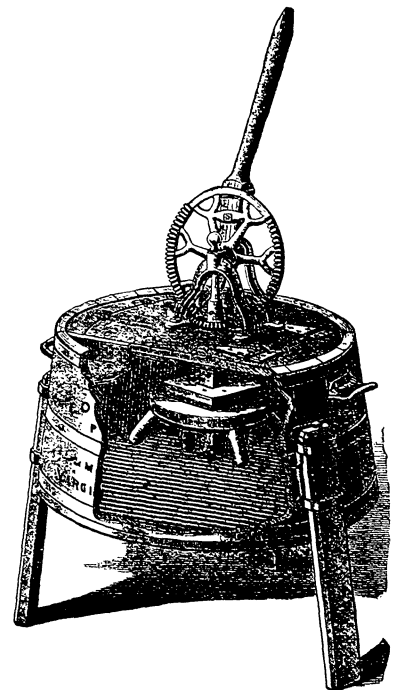
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The latest and best. Perfectly noiseless. Neat in appearance.

Manufactured by  
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## The Columbia Washing Machine.



Made of best selected Virginia White Cedar. Extra  
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Galvanized Hoops, Castings and Trim-  
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Sides and Bottom Corrugated.  
Prices and Catalogue Sent for the Asking.

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Manufacturers of Woodenware, RICHMOND, VA.

# THE VICTOR DOUBLE TROLLEY STORE LADDER.

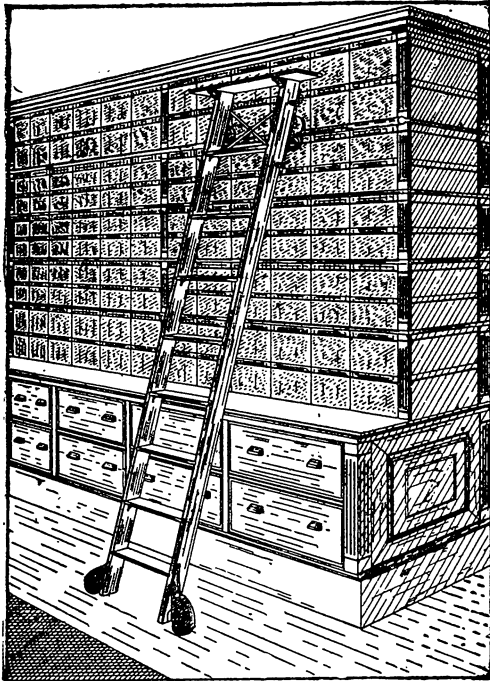
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EASILY.  
NOISELESSLY.

**HANDY** ILIY ADJUSTED  
TO USE.

**COSTS** SO LITTLE THAT  
EVERY ESTABLISHM'NT  
CAN AFFORD TO HAVE IT

All orders are sold subject to thirty days' trial and if not satisfactory may be returned at our expense.

SEND FOR CIRCULAR.



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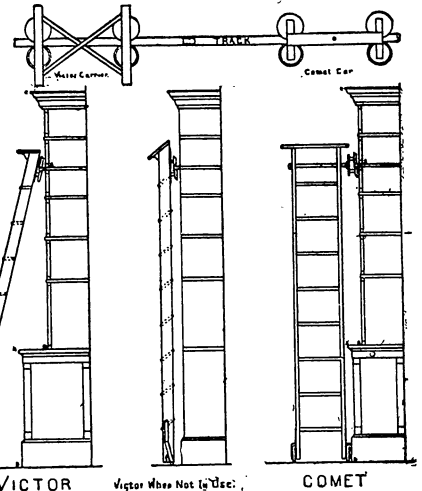
Risk your neck  
on a barrel

**DON'T**

Try to jump  
with mouth full of  
screws and hands full  
of something else.

**DON'T**

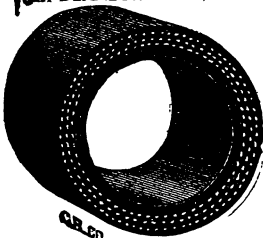
Fail to send for  
price of Victor Lad-  
ders.



**COBURN TROLLEY TRACK MFG. CO., HOLYOKE, MASS. ALSO PARLOR, BARN AND FIRE-DOOR HANGERS.**

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**NEW SEAMLESS TUBE**



**Who Has Not Had Bad Hose?**

Who has not lost time, patience, money, by attempting settlement for such goods?

**THE CAUSE** in nine cases out of ten is the lapped seam.  
**THE REMEDY** is in buying our

**PATENT SEAMLESS TUBE HOSE,**

made by machinery, the tube run like lead pipe, through a die. There is no lapped tube, no seam, no cracks, no defects; water cannot get through to rot the duck and cause the hose to burst.

Made in All Sizes and Kinds of Garden, Engine, Steam, Fire, Brewers', Cotton Hose, &c.

Order a Sample Bale of our Seamless-Tube Hose—Best in the World, costs no more than ordinary lapped-seam hose. The different colors, Red, White, Black, Green and Yellow, make a fine window or sidewalk attraction.

**CLEVELAND RUBBER WORKS**

of the Mechanical Rubber Co.,

CLEVELAND, O.

Makers of Mechanical Rubber Goods, Clothing, Druggists' Sundries, Specialties, Etc.

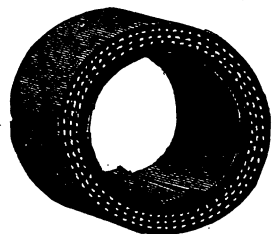
**SALES OF**  
**Over Two Million Feet**

—OF—

**GARDEN HOSE**

alone during the past year, distributed throughout the United States, and not a single piece complained of, justifies us in guaranteeing that it will give absolute satisfaction.

**OLD LAPPED TUBE**



We were awarded an order for 25,000 ft. for World's Fair of our celebrated

**Seamless-Tube**  
COTTON RUBBER-LINED HOSE

**We Want Your Trade.**  
Send for 60-page Catalogue.  
Write for Prices and Samples.



We are now prepared to promptly fill all orders for the

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**BURGLAR**

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The Cheapest, Strongest, Lightest Dead Rim Lock made.

Write for Prices and Circulars.

**THE WARNER LOCK CO.,**  
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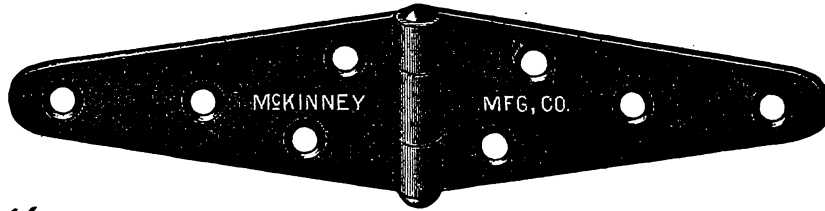
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STANDARD GOODS.

McKINNEY MFG. CO., - ALLEGHENY, PENN.

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ON SIGHT.

"NONE BETTER."

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are the recognized leaders in their respective lines. Do not fail to get our special fall trade price-list; it is new and away down.

Write us for estimates on Extra Fine Soft Grey Iron and Brass Castings.

We have exceptional facilities for manufacturing articles of all kinds from iron and brass. Get our prices and save money.

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Ball For Stanley's Steel Butts.

Bearing



Washers

Doors hung with these Butts require no oiling, do not creak, work perfectly.

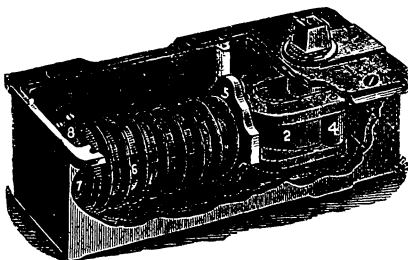
PRICES ON APPLICATION.

The Stanley Works, New Britain, Conn.  
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## SASH WEIGHTS.

KINGS COUNTY IRON FOUNDRY,

Office and Works, Nos. 86, 88, 90, 92 North 12th St.,  
BROOKLYN, N. Y.



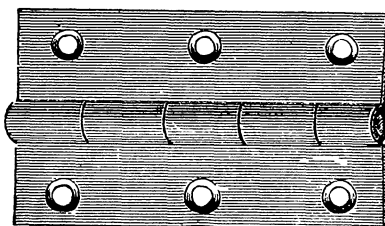
### CHECKING SPRING HINGES

For Double or Single Acting Doors.

Applied in floor under door. They close the door gently, without noise or violence, and stop it at once at the center. Doors cannot sag, springs do not break or set. Send for new price-list.

J. BARDSLEY,

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### Cast Brass Butt Hinges

IN STOCK AND FOR SALE BY

W. & J. TIEBOUT,

Nos. 16 & 18 Chambers Street, New York.

MANUFACTURERS OF

BRASS, GALVANIZED & SHIP CHANDLERY  
HARDWARE.

## "Duplex" Wrought Butts:

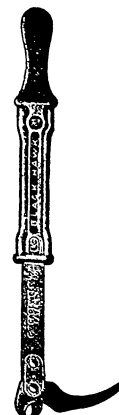
Wrought Steel—Wrought Bronze  
—Cold Rolled—Finely Finished—  
Steel Bushed through the whole  
length of barrel.

Better than ordinary  
kinds in every way.

Reading  
Hardware  
Company,

NEW YORK, PHILA., CHICAGO.  
Factories, Reading, Pa.

## "Coming Events Cast their Shadows B4,"



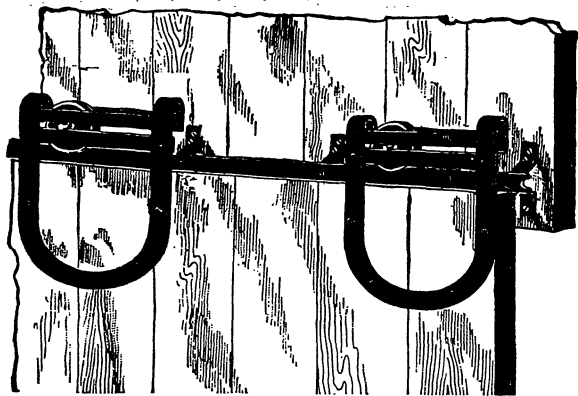
Remarked the Puller  
as he quickly withdrew  
the Nail from his  
"wooded" seclusion.

**THE BLACK HAWK**  
said this, for no other  
penetrates all woods so  
easily and effectually.  
For strength and dura-  
bility it has no equal.

American Specialty Co.,  
HARTFORD, CONN.

The Iron Age Standard Hardware Lists For Use in Price Books. Compiled by R. R. WILLIAMS, Hardware Editor of *The Iron Age*. These lists are supplied in pamphlet form and are intended to be cut out and inserted in *The Iron Age* Hardware Price Books. For this purpose they are printed on thin and tough paper of the best quality, and prepared with a special view to compactness and convenience of reference. Some of the lists are printed in more than one arrangement, permitting a choice of the best adapted.

For Sale by David Williams 96-102 Reade St., N. Y.



## Lane's Patent Steel Barn Door Hangers,

"O. N. T." Track for same.

The first Anti-friction Steel Door Hanger placed upon the market and to-day stands as the original and best. Sold in all the States of the Union, as well as abroad. Also Lane's Noiseless Steel Parlor Door Hanger, using Single Steel Track, a great success.

Lane's Pat. Self-measuring Faucet, measuring liquids as drawn. Swift's Coffee Mills in great variety.

Manufactured by **LANE BROS.**, Poughkeepsie, N. Y.

JOHN H. GRAHAM & CO., General Agents, 113 Chambers St., NEW YORK.

## Ideal Sash Pulley

No. 60-65.

AUGER MORTISE—FACE PLATE.

Made with two inch wheel, plain and polished, cone axle bearings, noiseless and easy running; markers on the side to lay off the centers to bore the holes by.

The best and most uniformly made low-priced Sash pulley on the market.

Sample Free.

**STOVER MFG. CO.**,  
145 River St., Freeport, Ill.

## SASH WEIGHTS

**E. E. BROWN & CO.**,

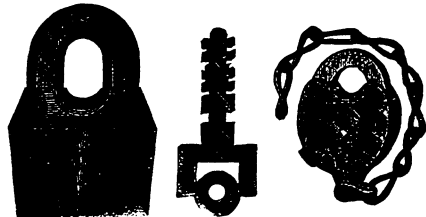
McKean and Meadow Sts.,

PHILADELPHIA, PA.

ESTABLISHED 1879.

## KEYSTONE LOCK WORKS

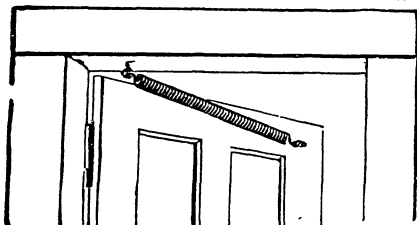
E. T. FRAIM, Lancaster, Pa., U. S. A.



Originators, designers, patentees and manufacturers of all the leading popular styles of **PADLOCKS**, Key-Locking Scandinavian with our patent Inter-Locking Tumblers; the only reliable lock of this style ever made. **SELF-LOCKING** Scandinavian of the highest type of perfection. Dust Proof Railroad, Freight Car and Switch Padlocks. Brass, Bronze, Steel and Malleable Iron Padlocks for all purposes and in all finishes. 131 different kinds. Write for our new 100-page catalogue.

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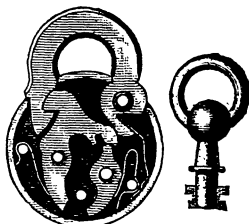
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Cheap, Simple, Durable, Effective.  
Best Screen Door Spring made. Send for our list of references, comprising some of the first houses in the land. They sell readily, and that is what you are looking for. Drop us a postal.

**COILED WIRE BELTING CO.**,  
40 & 42 Noble St., Jersey City.

## Defies Competition for Quality and Price.



PATENT PERFECTION

Eight Tumblers. Key turns both ways

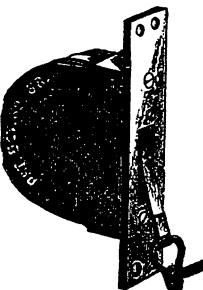
## PADLOCK.

Sizes,  $\frac{1}{4}$  inch to  $2\frac{1}{4}$  inches, of cast bronze. No steel or iron used, cannot rust, and cannot be picked. Also,  $\frac{1}{4}$  and  $\frac{1}{2}$  inch Padlocks, opened with a common pin, in brass and nickel, for cats and small dogs. The best Railroad Switch and Car Lock in the world.

Adopted by the United States Treasury for bonded warehouses.

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To buy an inferior article, which your trade condemns, when you can get

## THE CALDWELL SASH BALANCE.

The best material, right principle and care in making and testing have made it the **LEADER** for five years. Write to

**CALDWELL MFG. CO.**, Rochester, N. Y.



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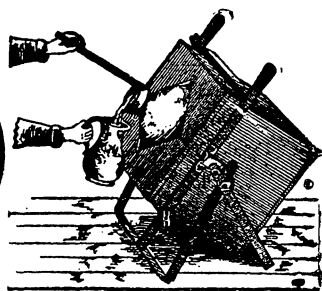
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Spring Padlocks,  
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WHEN THE STEEL AND IRON

## TACKLE BLOCKS

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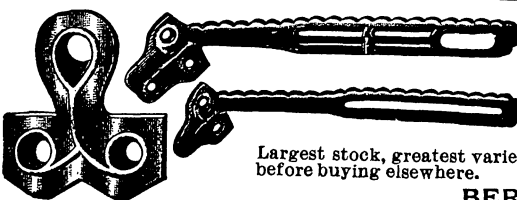
**The Cleveland Block Co.**,

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**ARE BETTER IN EVERY WAY.**

No waste material. Every ounce of weight in the line of strength. No clumsy outside straps or bolts. As light as wooden blocks and vastly more durable. They wear, but never break. Sheaves interchangeable.

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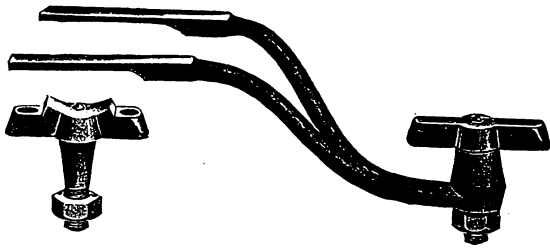
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Largest stock, greatest variety. Prices lower than ever. Write us before buying elsewhere.

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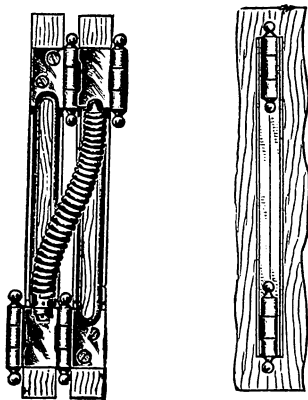
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 WORKS AT MAYWOOD, ILL.



It has no equal for hard service.

The reinforce piece stiffens the back and braces the ends.



Highest Award, World's  
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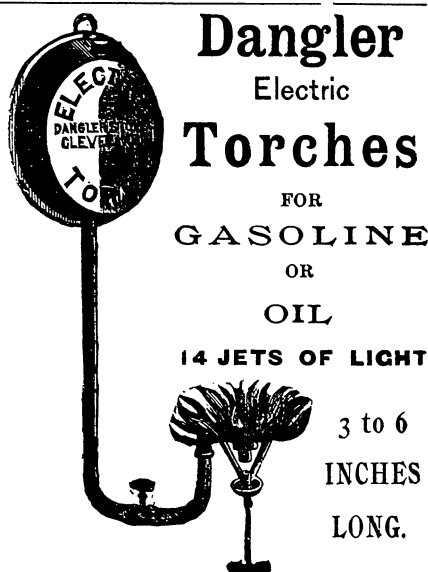
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**Dangler**  
 Electric  
**Torches**

FOR  
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14 JETS OF LIGHT

3 to 6  
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FOR lighting manufacturing establishments, such as Rolling Mills, Foundries, Machine Shops, Engine Rooms, &c., &c., with a convenient, portable, brilliant, steady light, and by cheaper means than by Coal Gas.

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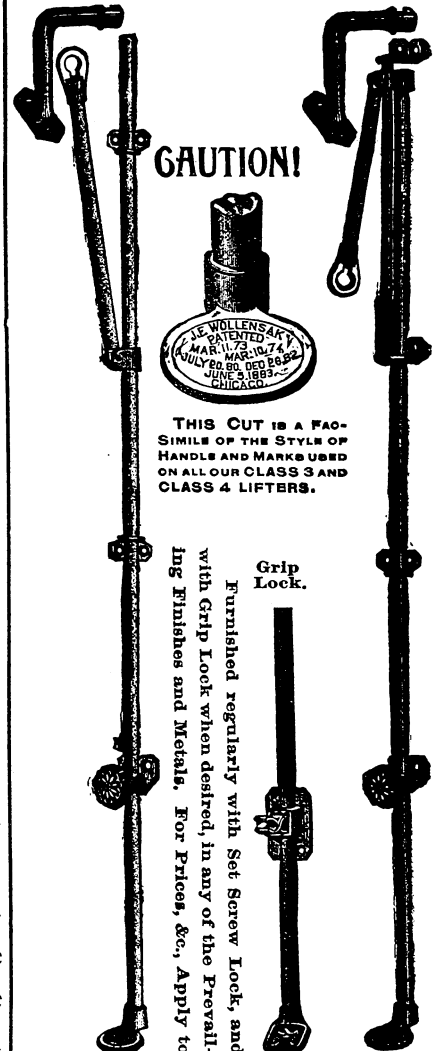
**Transom...Lifters**

OLD RELIABLE

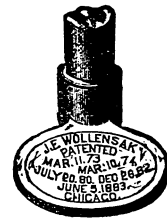
J. F. WOLLENSAK'S PATENT.

CLASS 3.

CLASS 4.



CAUTION!



THIS CUT IS A FAC-SIMILE OF THE STYLE OF HANDLE AND MARKS USED ON ALL OUR CLASS 3 AND CLASS 4 LIFTERS.

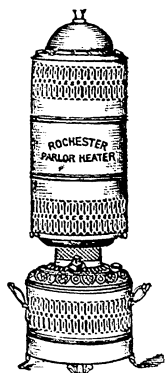
Furnished regularly with Set Screw Lock, and with Grip Lock when desired, in any of the Prevailing Finishes and Metals. For Prices, &c., Apply to

**J. F. WOLLENSAK, CHICAGO, ILL.**

"It Will Take the Chill  
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**THE ROCHESTER  
 PARLOR HEATER.**

Mr. Russell Sage, the well known New York banker, has bought a good many lamps of us, and Mr. Sage is not given to buying or recommending articles without merit. This is what he says of The Rochester Parlor Heater:



NEW YORK, Sept. 24, 1894.

The Rochester Lamp Co.,  
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Respectfully yours, RUSSELL SAGE.

**THE ROCHESTER LAMP CO.,**

42 Park Place, } New York.  
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## SHOENBERGER & CO., PITTSBURGH, PA.,

After numerous and costly experiments have succeeded in manufacturing a special quality of soft homogeneous steel, specially adapted to the manufacture of Horse and Mule Shoes, and are now making from this steel Extra Swaged and Government Pattern Horse and Mule Shoes. They give the best of satisfaction everywhere and we furnish them to the trade at the same prices as the regular iron shoe sold by ourselves and our competitors. We are at present making our Roadster Pattern Horse Shoes out of Iron, but we will make them of Steel also within a short time.



### JUNIATA STEEL TOE CALKS.

We would also call your attention to our improved Steel Toe Calk, equal to any in the market. To secure the best wearing qualities, use sand or borax in welding on the Calk and cool off at a dark, or still better, cool off without plunging in water.

No. 1, 2, 3, 4, 5 and 6.  
Packed in 25 lbs.

Soft Steel Horse  
Shoe Bar, all sizes.

### No. 2 EXTRA SWAGED FRONT.

The advantages of these shoes are that, being made of vastly superior material, they will never show signs of red-shortness or cold shortness, will never split in the crease and will always show a much finer finish than any iron shoe.

We make the Steel Shoes lighter than the Iron, giving more shoes to the keg, as follows:

No. 1, 15 more shoes to the keg.	No. 3, 10 more shoes to the keg.
" 2, 14 " " " "	" 4, 8 " " " "

And other sizes in proportion.

We also beg to say that we have introduced improved machinery into our new factory and have doubled our capacity, and are now prepared to furnish the best shoe, either iron or steel, ever offered to the trade. Write to us for information and prices, or apply to jobbers and dealers, who sell them everywhere.

## SHOENBERGER & CO.,

JUNIATA IRON AND STEEL WORKS, - - - PITTSBURGH, PA.

# SCRANTON FORGING CO.,

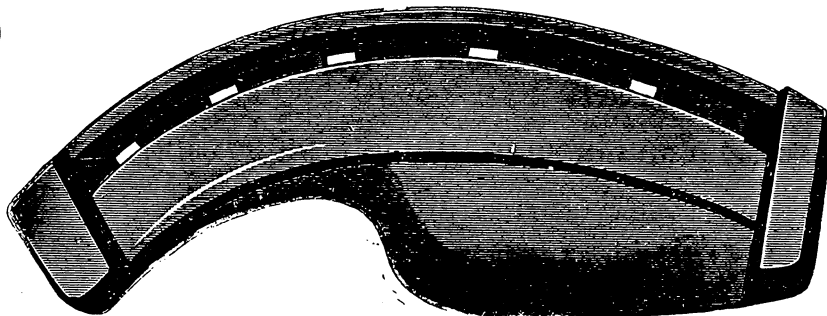
SCRANTON, PA

## CARRIAGE HARDWARE AND SPECIAL DROP FORGINGS.

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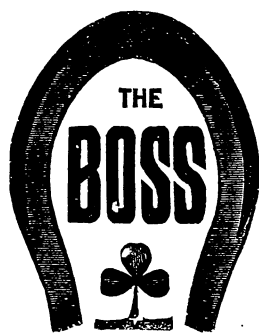
SHOES.



Made under Deeble's Patent, Aug. 9, 1887.

Our 1891 pattern is a modification of the style we have made for the past four years, giving additional strength to the web.

IT IS JUST RIGHT.



## HORSE AND MULE SHOES,

Superior Quality, Shape and Finish.

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RHODE ISLAND PERKINS HORSE SHOE CO.,  
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### Horse and Mule Shoes of the Perkins Pattern.

SPECIALTIES:—X L Steel Shoes, Toe Weight Shoes and Goodenough Shoes.  
Works at Valley Falls, R. I. Office, 31 Exchange Place, Providence, R. I.  
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Elegant Iron.

Beautiful Shape.

HORSE SHOES,

*Light, Medium and Heavy.*

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*Light, Medium and Heavy.*

Illustrated booklet and prices to all  
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OLD DOMINION IRON AND NAIL WORKS CO.,

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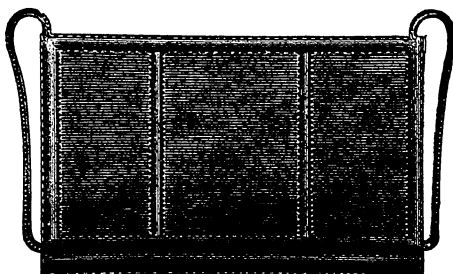
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MANUFACTURERS OF

Dashes,  
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Largest Capacity in  
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Iron

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ROLLING MILLS AND FACTORIES,  
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Manufacturers of

## HORSE AND MULE SHOES.

Made from best quality of Scrap Iron  
and old Horse Shoes.

4 Liberty Square, Boston, Mass.

# Capewell Horse Nails.

HIGHEST AWARD.

GOLD MEDAL

Office, Manufacturers' Building, Midwinter Fair.

SAN FRANCISCO, CAL., July 1st, 1894.

THE CAPEWELL HORSE NAIL CO., Hartford, Conn.

Gentlemen:—The official list of awards of the American Exhibitors has been handed to me to-day by the Director-General, and I am pleased to notify you officially that your exhibit received the First Award, which is a gold medal. Yours respectfully,

EDWARD SCOTT, U. S. Commissioner.

CENTENNIAL EXPOSITION  
AT PHILADELPHIA.

WORLD'S COLUMBIAN EXPOSITION  
AT CHICAGO.

## HIGHEST AWARD

TO THE

# PUTNAM

HOT-FORGED AND HAMMER-POINTED

# HORSESHOE NAILS.



CALIFORNIA MID WINTER INTERNATIONAL EXPOSITION.

PUTNAM NAIL CO.,  
Boston, Mass.

GENTLEMEN:—The official list of awards of the American Exhibitors has been handed to me to-day by the Director General, and I am pleased to notify you officially that your exhibit, at the California Mid Winter International Exposition, has received the first award for horse shoe nails. The first award is a gold medal.

Yours respectfully,

EDWARD SCOTT,  
U. S. Commissioner.

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# H. D. SMITH & CO..

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MANUFACTURERS OF THE BEST QUALITY

## CARRIAGE MAKERS' HARDWARE,

MANUFACTURE THE LARGEST VARIETY OF

# FORGED CARRIAGE IRONS

Of Best Material and Workmanship.

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Manufactured by the NATIONAL HORSE NAIL CO.,  
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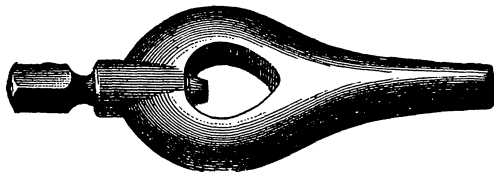
All Sizes. All Patterns. All Warranted. Sold Everywhere.

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## LE COUNT'S STRAIGHT TAIL DOG,

WITH STEEL SCREWS.

U. S. Standard, and the points hardened. To be driven from a stud in the face plate.  
It is from the same pattern as the Heavy Steel Dog, and warranted, like that, not to break with any work.



No.	Inch.	Price.	No.	Inch.	Price.
1.....	3/4.....	\$0 80	11.....	2 1/2.....	\$1 45
2.....	1.....	70	12.....	3.....	1 60
3.....	1 1/4.....	80	13.....	3 1/2.....	1 80
4.....	1 1/2.....	80	14.....	4.....	2 10
5.....	1 3/4.....	80	15.....	4 1/2.....	2 75
6.....	1 7/8.....	95	16.....	5.....	3 25
7.....	2.....	95	17.....	5 1/2.....	4 00
8.....	2 1/4.....	1 10	18.....	6.....	5 00
9.....	2 1/2.....	1 20	19.....	7.....	6 00
10.....	2 3/4.....	1 35	20.....	8.....	7 00

One set to 2 inch, \$7.80. Full set, \$44.10

This pattern will stand much more than a bent tail, and some prefer them on account of their direct action on the work.

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Of every description. Also Special Forgings.

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COIL SPRING SHAFT SUPPORT  
AND ANTI-RATTLER.

GET THE BEST  
SELLS AT SIGHT

Past sellings always give satisfaction. No weight on horse. Worth twice the cost for convenience in hitching up. Agents wanted. Send stamp for circular. Price, \$1.00. State rights for sale.

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**P. F. BURKE, C. F. DEWICK & CO.**  
Successor to  
Manufacturer of  
**PATENT STEEL**  
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**TOE-CALKS.**  
—ALSO—  
BURKE'S IMPROVED  
**HORSESHOERS'**  
**FOOT VICE.**  
Send for Circulars.  
360 Dorchester Av. Die for Welding  
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**CRESCENT HORSE SHOE**  
**IRON CO.**

Max Meadows, Va.

**FROST'S ANTI-RATTLER**  
Pat. Jan. 20, 1880.  
Cut One-half Size.  
Sample pair sent to any hardware or saddlery firm by addressing  
**The Frost Thill Spring Co.,**  
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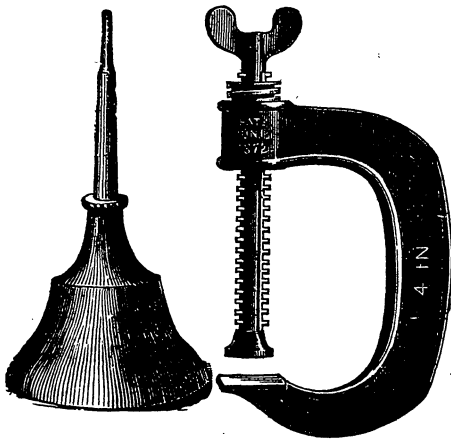
**BICYCLE and other  
DROP FORGINGS**  
Made to Order.  
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**NEW** pattern Heavy Screw Clamps.  
Strongest in the market.



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For sale by all the principal Hardware Dealers.  
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MALLEABLE IRON CASTINGS  
of superior quality, and Hardware Specialties in  
Malleable Iron made to order.

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to their customers as a reliable substitute for  
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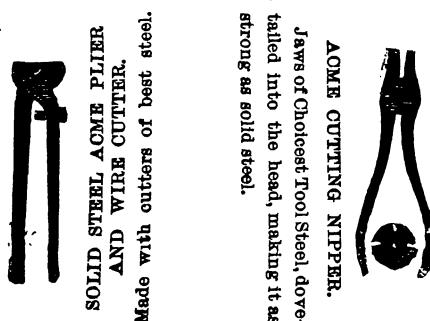
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Made with cutters of best steel.

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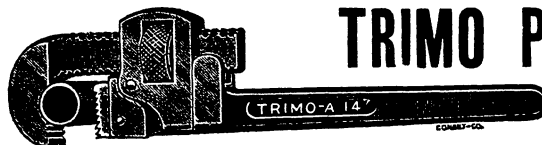
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*Improved Adjustable S-Wrench.*  
Case-Hardened Throughout. Parts Interchangeable.

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## TRIMO PIPE WRENCH.

Forged Steel.

All Parts Interchangeable.

Grips firmly without loss of motion. Releases readily. Never locks. Causes no  
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The chain holds securely;  
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Interchangeable gripping jaws.



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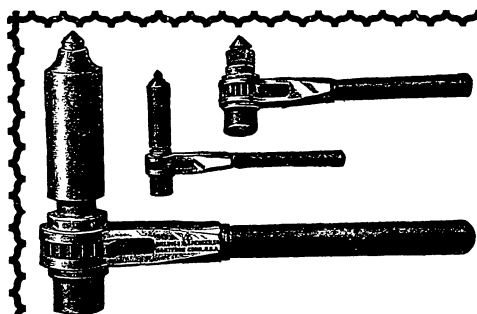
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Genuine Packer  
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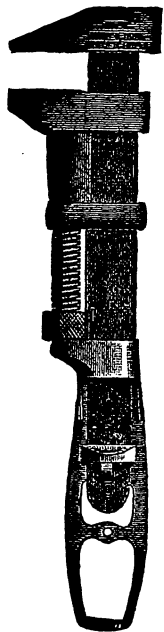
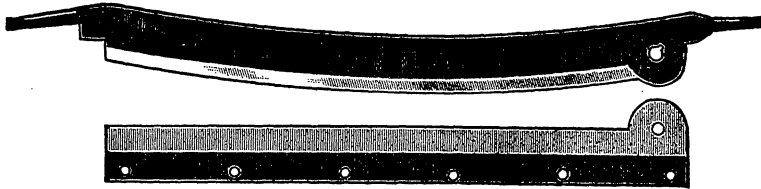
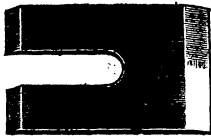
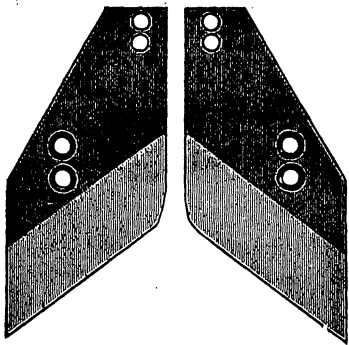
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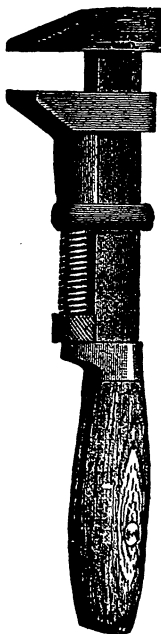
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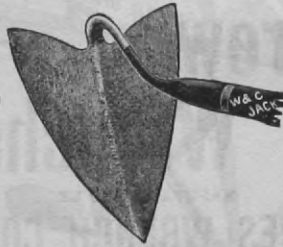
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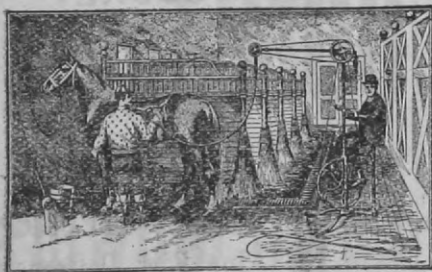


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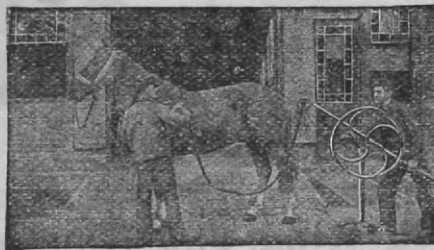


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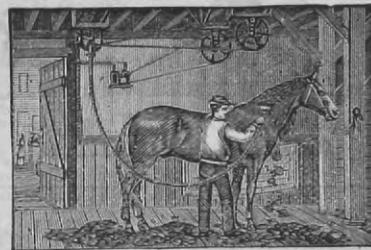
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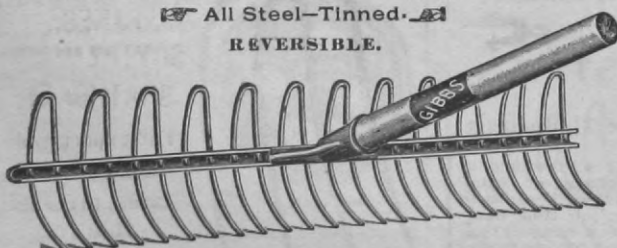
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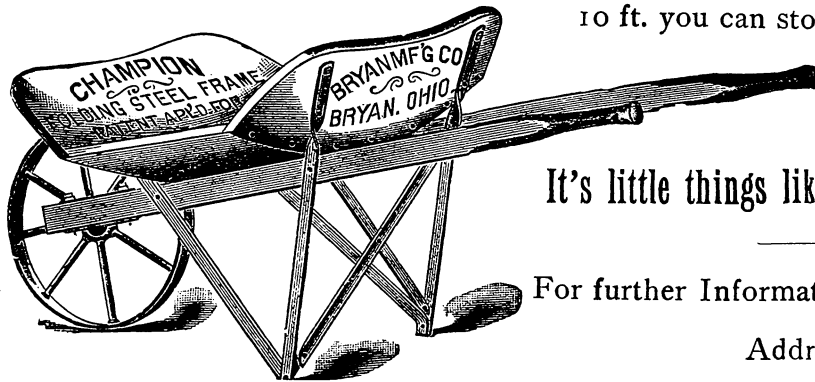


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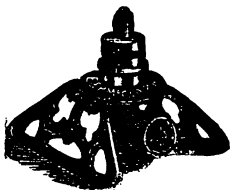
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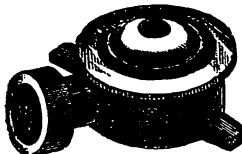


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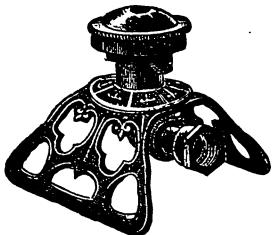
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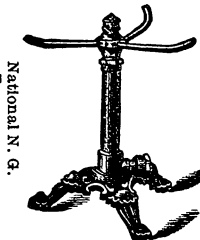


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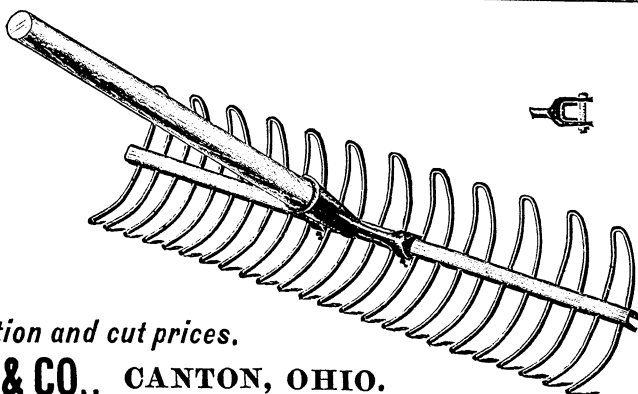
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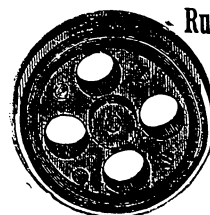
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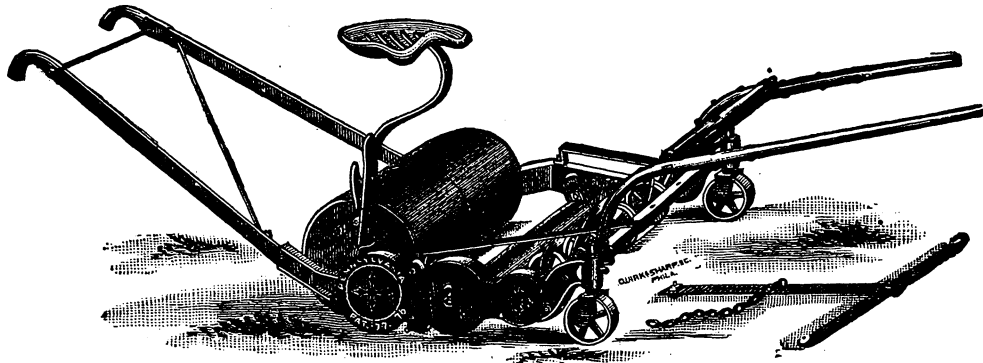
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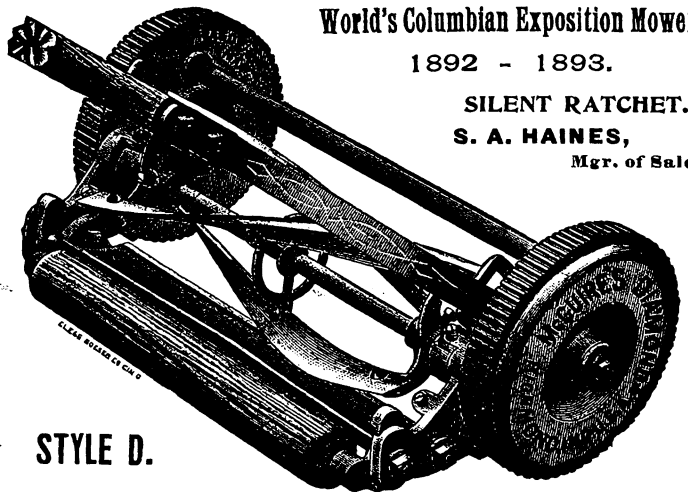
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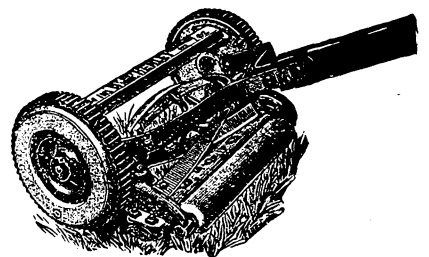
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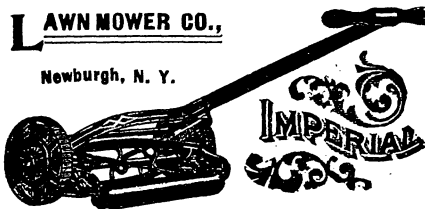


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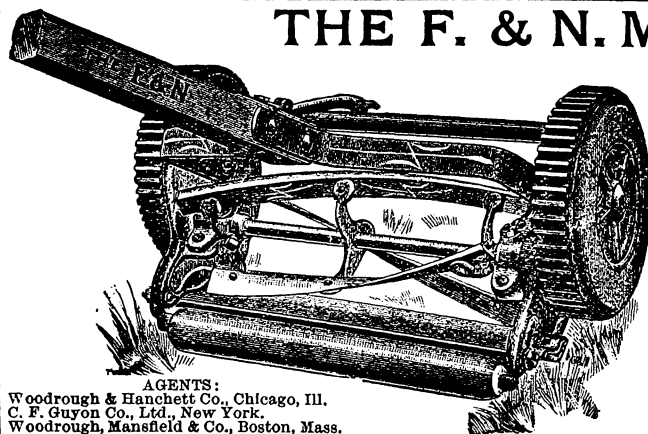
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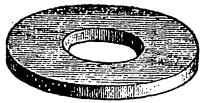
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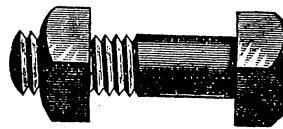


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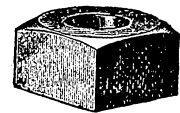
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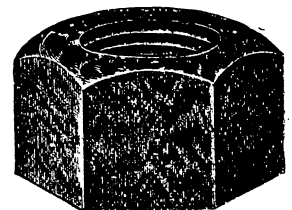
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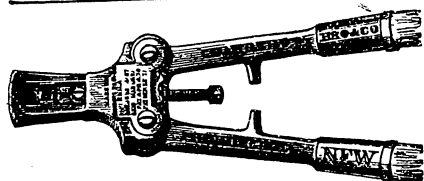
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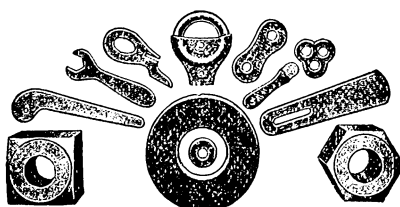
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Allentown Rolling Mill, Allentown, Pa.  
Burden Iron Co., Troy, N. Y.  
Crescent Horse Shoe & Iron Co., Max Meadows, Va.  
Montour Iron & Steel Co., Danville, Pa.  
Mahoning Valley Iron Co., Youngstown, Ohio.  
Sternbergh, J. H. & Son, Reading, Pa.

## Barrel Openers.

Am. Specialty Co., Hartford, Conn.

## Bellows, Manufacturers of.

Scott, Geo. A., Chicago, Ill.

## Bells.

Bevin Bros. Mfg. Co., East Hampton.

## Belt Dressing.

Jos. Dixon Crucible Co., Jersey City, N. J.

## Belt Fasteners.

Bristol Co., Waterbury, Conn.  
Claffen Mfg. Co., Cleveland, Ohio.  
Sawyer Hdw. & Supply Co., Pawtucket, R. I.  
Talcott, W. O., Providence, R. I.

## Belting, Makers of.

Alexander Bros., 412 N. 3d, Phila.  
Jeffrey Mfg. Co., Columbus, O.  
Link-Belt Engineering Co., Phila., Pa.  
Main Belting Co., Philadelphia, Pa.  
N. Y. Belting & Packing Co., Ltd., N. Y.  
Roberts Mfg. Co., Pittsburgh, Pa.  
Shultz Belting Co., St. Louis, Mo.

## Bicycles and Bicycle Sundries.

Bevin Bros. Mfg. Co., E. Hampton, Mass.  
Crawford Mfg. Co., Hagerstown, Md.  
Eagle Bicycle Mfg. Co., Torrington, Ct.  
Grand Rapids Cycle Co., Grand Rapids, Mich.  
League Cycle Co., Hartford, Conn.  
Lovell, Jno. P. Arms Co., Boston, Mass.  
Pope Mfg. Co., Boston, Mass.

## Bicycle Spokes.

Excelsior Needle Co., Torrington, Ct.

## Bit Braces.

Amidon Tool Corp., Buffalo, N. Y.

## Blocks, Tackle, Makers of.

Cleveland Block Co., Cleveland, O.  
Fulton Iron & Engine Works, Detroit, Mich.

## Blowers.

Buffalo Forge Co., Buffalo, N. Y.  
Champion Blower & Forge Co., Lancaster, Pa.  
Sturtevant, B. F. & Co., Boston, Mass.

## Boiler Plates.

Carbon Steel Co., Pittsburgh, Pa.  
McIlvain, Wm. & Sons, Reading, Pa.  
Lukens Iron & Steel Co., Coatesville, Pa.  
Pottstown Iron Co., Pottstown, Pa.

## Boilers, Copper.

Randolph & Clowes, Waterbury, Conn.

## Boilers, Steam.

Babcock & Wilcox Co., 30 Cortlandt.  
Harrison Safety Boiler Wks., Phila., Pa.  
Pollock, W. B. & Co., Youngstown, O.  
Porter, H. K., Boston, Mass.  
Southwick Fdy. & Mch. Co., Phila., Pa.  
Sterling Co., Chicago, Ill.  
Wetherill, Robt. & Co., Chester, Pa.

## Bolt Cutters.

Chambers Bros. Co., Philadelphia.  
Howard Iron Works, Buffalo, N. Y.  
Wells Bros. & Co., Greenfield, Mass.

## Books.

Republic Press, 14 Lafayette Place, N. Y.  
Williams, David, 96-102 Reade, N. Y.

## Boring Machines.

Buckeye Mfg. Co., Union City, Ind.

## Box Banders.

Goodell, J. W., Burlington, Vt.

## Boxes, Hdw. Shell, &c.

Green, A. H., 22 Park Place, N. Y.  
Jones, Jesse & Co., Philadelphia, Pa.

## Brass, Manufacturers of.

Ansonia Brass & Copper Co., N. Y.  
David, John & Sons, 100 John, N. Y.  
Plume & Atwood Mfg. Co., N. Y.  
Randolph & Clowes, Waterbury, Conn.  
Rome Brass & Copper Co., Rome, N. Y.  
Seovill Mfg. Co., Waterbury, Conn.  
Waterbury Brass Co., 296 E'way, N. Y.

## Brass Butt Hinges.

Tiebout, W. & J., 16 & 18 Chambers.

## Brass Founders.

Crimp, Wm. & Sons S. & E. B. Co., Philadelphia, Pa.  
Eynons-Evans Mfg. Co., Philadelphia, Pa.  
Fram, E. T., Lancaster, Pa.  
Haight & Clark, Albany, N. Y.  
Keys, W. W. & R. M. Co., Bridgeport, Conn.  
North Bros. Mfg. Co., Phila., Pa.  
Reeves, Paul S., Philadelphia.

## Brass Goods.

Brass Goods Mfg. Co., 88 Chambers.

## Bread and Cake Knives.

Cincinnati Mfg. Co., Cincinnati, O.  
Clausen Shear Co., Fremont, O.

## Bridge Builders.

Berlin Iron Bridge Co., East Berlin, Ct.

## Bronze (Tobin).

Ansonia Bronze & Copper Co., 19-21 Cliff Street, N. Y.  
Bridgeport Deoxidized Bronze & Metal Co., Bridgeport, Conn.

## Brooms and Brushes.

Rice Mfg. Co., New Durham, N. H.

## Builders' Hardware.

Deitz, A. E., 97 Chambers St., N. Y.  
Reading Hdw. Co., Reading, Pa.  
Yale & Towne Mfg. Co., Stamford, Ct.

## Burr Wheels.

Torrance Iron Co., Troy, N. Y.

## Butchers' Steels.

Chatillon, John & Sons, 85-89 Cliff St., N. Y.

## Butcher and Shoe Knives, Manufacturers of.

Chatillon, John & Sons, 85-89 Cliff St., N. Y.  
Goodell Co., Antrim, N. H.  
Wilson, John, Sheffield, England.

## Butts and Hinges.

McKinney Mfg. Co., Allegheny, Pa.  
Sabin Machine Co., Montpelier, Vt.

Stanley Works, New Britain, Conn.  
Tiebout, W. & J., 16 Chambers, N. Y.  
Wrightsville Hdw. Co., Wrightsville, Pa.

## Calipers and Dividers.

J. Stevens Arms and Tool Co., Chicopee Falls, Mass.  
Starrett, L. S., Athol, Mass.

## Car Axles.

Roberts, A. & P. & Co., Phila.

## Carboy Stands.

Wolf, W. & L., Philadelphia, Pa.

## Carriage Hardware, Makers of.

Clapp, E. D. Mfg. Co., Auburn, N. Y.  
Covert's Saddlery Works, Farmer, N. Y.  
Eccles, Richard, Auburn, N. Y.  
McKinnon Dash & Hdw. Co., Ltd., Buffalo, N. Y.  
Scranton Forging Co., Scranton, Pa.  
Smith, H. D. & Co., Plantsville, Conn.  
Wilcox & Howe, Birmingham, Conn.

## Cartridge Reloading Tools.

Ideal Mfg. Co., New Haven, Conn.

## Carvers' Tools.

White, Van Glahn & Co., 15-17 Chatham Square, N. Y.

## Casters, Wheel, &c.

Clark G. P., Windsor Locks, Conn.

## Castings, Iron and Steel.

Allentown Hdw. Wks. Allentown, Pa.  
Booth, The Lloyd Co., Youngstown, O.  
Boston Casting Co., So. Boston, Mass.  
The Burr & Houston Co., Brooklyn, N. Y.  
Cheney, S. & Son, Manlius, N. Y.  
Chester Steel Casting Co., Phila.  
Chrome Steel Works, Brooklyn, N. Y.  
Eureka Cast Steel Co., Chester, Pa.  
Flagg, Stanley G. & Co., Phila.  
Garland Foundry Co., Cleveland, O.  
Haight & Clark, Albany, N. Y.  
Palmer & De Mooy Fdry. Co., Cleveland, O.  
Pratt & Cady Co., Hartford, Conn.  
Sessions Foundry Co., Bristol, Conn.  
Shickle, Harrison & Howard Iron Co., St. Louis, Mo.  
Sponcer's I. S. Sons, Guilford, Conn.  
Standard Fdy. & Mfg. Co., Cleveland, O.  
Torrance Iron Co., Troy, N. Y.  
Union Lock & Hdw. Co., Lancaster, Pa.  
Walker Mfg. Co., Cleveland, Ohio.  
Wetherill, Robert & Co., Chester, Pa.  
Wilcox, Crittenden & Co., Middletown, Conn.

## Castings, Malleable.

Arcaide Malleable Iron Co., Worcester, Mass.  
Hammer & Co., Branford, Conn.  
Torrance Iron Co., Troy, N. Y.

## Catalogue Files.

Folding Paper Box Co., So. Bend, Ind.

## Chains.

Bradley & Co., Philadelphia.  
Garland Chain Co., Rankin, Pa.  
Link Belt Engineering Co., Phila., Pa.  
McKay, Jas. & Co., Pittsburgh, Pa.

## Chimneys.

Phila. Engineering Works, Phila., Pa.

## Chisels, Manufacturers of.

Buck Bros., Millbury, Mass.  
Buck, Chas., Millbury, Mass.  
White, L. & J. J. Co., Buffalo, N. Y.

## Chucks.

Cushman Chuck Co., Hartford, Conn.  
Hogson & Pettis Mfg. Co., New Haven, Conn.  
Skinner Chuck Co., New Britain, Conn.  
Smith & Edge Mfg. Co., Bridgeport.  
Union Mfg. Co., 103 Chambers, N. Y.  
Whiton, D. E. Mach. Co., New London, Conn.

## Clamps.

Hammer & Co., Branford, Conn.  
Le Count, C. W., So. Norwalk, Conn.

## Clipping Machines.

Gillette Clipping Machine Co., 201 E. 23d Street, N. Y.

## Coal.

Barns, C. K. & Co., Philadelphia, Pa.  
Wister, Francis, Philadelphia, Pa.

## Coffee Mills.

Enterprise Mfg. Co., Phila., Pa.  
Parker, Chas. Co., Meriden, Conn.

## Coke.

Barns, C. K. & Co., Philadelphia, Pa.  
Houston, C. B. & Co., Philadelphia, Pa.  
Rainey, W. J., Cleveland, O.  
Wister, Francis, Philadelphia, Pa.

## Collections.

Hardware Board of Trade (Limited), 4 and 6 Warren, N. Y.

## Condensers.

Worthington, Henry R., 86 & 88 Liberty Street, N. Y.

## Conveying Machinery.

Brown Hoisting & Conveying Machine Co., Cleveland, Ohio.  
Jeffrey Mfg. Co., Columbus, O.  
Link-Belt Engineering Co., Phila., Pa.

## Copper.

Ames Sword Co., Chicopee, Mass.  
Ansonia Brass & Copper Co., 19 and 21 Cliff St., N. Y.  
Hendricks Bros., 49 Cliff, N. Y.  
New Haven Copper Co., 294 Pearl, N. Y.  
Randolph & Clowes, Waterbury, Conn.  
Rome Brass & Copper Co., Rome, N. Y.  
Wister, Francis, Philadelphia, Pa.

## Cordage.

Samson Cordage Works, Boston, Mass.

## Cork Screws.

Williamson, C. T. Wire Novelty Co., Newark, N. J.

## Corrugated Furnaces.

Continental Iron Wks., Brooklyn, N. Y.

## Corrugated Iron.

Cincinnati Corrugating Co., Piqua, O.  
Jersey City Galvanizing Co., 112 John St., N. Y.  
Moseley Iron Bridge & Roof Co., 5 Day, N. Y.  
N. Y. Iron Roofing & Corrugating Co., Jersey City, N. J.

## Counting Machines.

Durant, W. N., Milwaukee, Wis.

## Cranes.

Maris & Beekley, Philadelphia, Pa.  
Ridgway, Craig & Sons, Coatesville, Pa.  
Sellers, Wm. & Co., Inc., Phila., Pa.  
Whiting Foundry Equipment Co., Chicago, Ill.  
Yale & Towne Mfg. Co., Stamford, Conn.

## Cupolas, Hot Blast.

Byram & Co., Detroit, Mich.  
Whiting Foundry Equipment Co., Chicago, Ill.

## Cutlery, Importers of.

Sickles, Sweet & Lyon, 35 Barclay, N. Y.

## Cutlery, Manufacturers of.

Bingham, W. Co., Cleveland, Ohio.  
Dame, Stoddard & Kendall, Boston, Mass.  
Goodell Co., Antrim, N. H.  
Northampton Cutlery Co., Northampton, Mass.  
Wilson, John, Sheffield, England.

## Cutlery Display Cases.

Union Show Case Co., Chicago, Ill.

## Dampers.

Arcaide Mfg. Co., Freeport, Ill.

## Dashes and Fenders.

McKinnon Dash & Hdw. Co., Ltd., Buffalo, N. Y.

## Dies.

Wilson, J. Fred, Worcester, Mass.

## Die Forgings and Castings.

Bliss, E. W. Co., Brooklyn, N. Y.

## Dish Washers.

Boigiano Mfg. Co., Baltimore, Md.

## Door Checks and Springs.

Bardsley, J., 149 & 151 Baxter St., N. Y.

## Door Springs.

Coiled Wire Belting Co., Jersey City, N. J.

## Drilling Machines.

Beaman & Smith, Providence, R. I.  
Bickford Drill & Tool Co., Cin. Ohio.  
Buffalo Forge Co., Buffalo, N. Y.  
Champion Blower & Forge Co., Lancaster, Pa.  
Dallett, Thos. H. & Co., Philadelphia.  
D'Amour & Littledale 204 E. 43d St., N. Y.  
Dietz, Schumacher & Co., Cincinnati, Ohio.  
Dwight Slate Machine Co., Hartford, Conn.  
Goddard, Asa, Worcester, Mass.  
Halsey, Jas. T., Philadelphia, Pa.  
Hamilton Mch. Tool Co., Hamilton, O.  
Quint, A. D., Hartford, Conn.  
Sellers, Wm. & Co., Inc., Phila., Pa.  
Sigourney Tool Co., Hartford, Conn.  
Silver Mfg. Co., Salem, O.  
Wiley & Russell Mfg. Co., Greenfield, Mass.

## Drop Forgings.

Billings & Spencer Co., Hartford, Conn.  
Boone, W. C. Mfg. Co., Booton, N. J.  
Clapp, E. Mfg. Co., Auburn, N. Y.  
Eccles, Richard, Auburn, N. Y.  
Merrill Bros., Brooklyn, E. D.  
R. I. Tool Co., Providence, R. I.  
Scranton Forging Co., Scranton, Pa.  
Wilcox & Howe Co., Birmingham, Conn.  
Wimot & Hobbs Mfg. Co., Bridgeport, Conn.  
Wyman & Gordon, Worcester, Mass.

## Drop Presses.

Bliss, E. W. Co., Brooklyn, N. Y.  
Crosby, G. A. & Co., Chicago, Ill.  
Miner & Peck Mfg. Co., New Haven, Conn.  
Stiles & Parker Press Co., Brooklyn, N. Y.  
Vulcan Iron Works, Chicago, Ill.  
Waterbury Farrel Foundry and Machine Co., Waterbury, Conn.

## Dumb Waiters.

Hutchinson, F. S. Co., 32 Warren Street, N. Y.  
Storm Mfg. Co., Newark, N. J.

## Dynamite.

New York Powder Co., 62 Liberty St., N. Y.

## Dyn

- Eng Beaters.**  
North Bros. Mfg. Co., Philadelphia, Pa.
- Electric Bells and Supplies.**  
Ostrander, W. R. & Co., 204 Fulton St., New York.  
Wollensak, J. F., Chicago, Ill.
- Elevator Buckets.**  
Clark, W. J. & Co., Salem, O.
- Elevators, Makers of.**  
Link-Belt Engineering Co., Phila., Pa.  
Morse, Williams & Co., Phila., Pa.  
Penna. Elevator Engineering Co., Phila., Pa.
- Emery and Emery Wheels.**  
Cutter, Wood & Stevens, Boston, Mass.  
Diamond Mach. Co., Providence, R. I.  
N. Y. Belting & Packing Co., Ltd., N. Y.  
Northrup Emery Wheel Co., Leeds, Mass.  
Norton Emery Wheel Co., Worcester, Mass.  
Sterling Emery Wheel Co., 174 Fulton St., N. Y.  
Tanite Co., Stroudsburg, Pa.
- Emery Wheel Dressers.**  
Bay State Stamping Co., Worcester, Mass.
- Engineers and Contractors.**  
Alken, Henry, Pittsburgh, Pa.  
Herrick, J. A., 284 Pearl St., N. Y.  
Kennedy, Julian, Pittsburgh, Pa.  
Laughlin, Alex. & Co., Pittsburgh, Pa.  
Lean, D. R., Co., Pittsburgh, Pa.  
McClure, Amster & Co., Pittsburgh, Pa.  
Pittsburgh Iron & Steel Engineering Co., Pittsburgh, Pa.  
Smythe, S. R. Co., Incorporated, Pittsburgh, Pa.  
Swindell, W. & Bros., Pittsburgh, Pa.
- Engines, Gas and Gasoline.**  
Buckeye Mfg. Co., Union City, Ind.  
Otto Gas Engine Works, Phila., Pa.  
Springfield Gas Engine Co., Springfield, Ohio.
- Engines, Steam, Makers of.**  
Allis, E. P. Co., Milwaukee, Wis.  
Bass Foundry & Machine Works, Ft. Wayne, Ind.  
Harris, Wm. A., Steam Engine Co., Providence, R. I.  
Norwalk Iron Works Co., So. Norwalk, Conn.  
Phila. Engineering Works, Phila., Pa.  
Southward Foundry & Machine Co., Phila., Pa.  
Tod, William & Co., Youngstown, O.  
Totten & Hogg Iron & Steel Fdry. Co., Pittsburgh, Pa.  
Westwick, Jno. & Son, Galena, Ill.  
Wetherill, Robt. & Co., Chester, Pa.
- Exciter.**  
Independent Electric Co., Chicago, Ill.
- Expansion Bolts.**  
Boone, W. C. Mfg. Co., Boonton, N. J.  
Church, Isaac, Toledo, N. Y.  
Steward & Romaine Mfg. Co., Phila., Pa.
- Exporters.**  
Flint & Co., 68 Broad St., N. Y.
- Faucets, Self-Measuring.**  
Lane Bros., Poughkeepsie, N. Y.
- Faucets, Wooden, Makers of.**  
John Sommer's Son, Newark, N. J.
- Feed-Water Heaters and Purifiers.**  
Davis, I. B. & Son, Hartford, Conn.  
Harrison Safety Boiler Works, Phila., Pa.  
National Pipe Bending Co., New Haven, Conn.  
Taunton Locomotive Mfg. Co., Taunton, Mass.  
Webster Warren & Co., Camden, N. J.  
Whitlock Coil Pipe Co., Elmwood, Conn.
- Fencing, Iron and Wire.**  
Barnum, E. T., Detroit, Mich.  
Champion Iron Co., Kenton, O.  
Chess Bros., Pittsburgh, Pa.  
Clinton Wire Cloth Co., Clinton, Mass.  
Gilbert & Bennett Mfg. Co., 48 Cliff St., N. Y.  
Kilmer Mfg. Co., Newburgh, N. Y.  
The Van Dorn Iron Works Co., Cleveland, O.
- Files, Importers of.**  
Moss, F. W., 80 John St., N. Y.
- Files and Rasps, Manufacturers of.**  
Arcade File Works, Anderson, Ind.  
Banker & White, Troy, N. Y.  
Barnett, G. & H., 41 & 43 Richmond, Phila.  
McCaffrey File Co., Philadelphia.  
Nicholson File Co., Providence, R. I.
- Fire Brick, Makers of.**  
Borgner, Cyrus, Philadelphia, Pa.  
Gardner, Jas. & Son, Cun-berland, Md.  
Kreischer, B. & Sons, foot E. Houston St., N. Y.  
Maurer, H. & Son, 420 E. 23d, N. Y.  
Ostrander Fire Brick Co., Troy, N. Y.  
Valentine, M. D. & Bro. Co., Woodbridge.
- Fire Doors.**  
Berlin Iron Bridge Co., E. Berlin, Conn.  
Coburn Trolley Track Mfg. Co., Holyoke, Mass.
- Fishing Tackle.**  
Dane, Stoddard & Kendall, Boston, Mass.
- Flint and Emery Paper.**  
Baeder, Adamson & Co., Phila., Pa.
- Fodder Cutters.**  
Silver Mfg. Co., Salem, O.
- Forges, Portable, &c.**  
Buffalo Forge Co., Buffalo, N. Y.  
Champion Blower & Forge Co., Lancaster, Pa.  
Foss Mfg. Co., Springfield, Ohio.  
Sturtevant, B. F. Co., Boston, Mass.
- Forgings, Iron and Steel.**  
Bethlehem Iron Co., S. Bethlehem, Pa.  
Cambria Steel-Cambria Iron Co., Johnstown, Pa.  
Frankford Steel Co., Phila., Pa.  
Scranton Forging Co., Scranton, Pa.  
U. S. Projectile Co., Brooklyn, N. Y.
- Forks, Hay and Manure.**  
Iowa Farming Tool Co., Ft. Madison, Iowa.  
Withington & Cooley Mfg. Co., Jackson, Mich.
- Foundry Facings.**  
Dixon, Jos., Crucible Co., Jersey City, N. J.  
S. Obermayer Co., Cincinnati, O.  
Smith's Pattern Works, Akron, Ohio.
- Foundry Riddles.**  
Estey, W. S., 85 Fulton, N. Y.
- Foundry Supplies.**  
Diamond Clamp & Flask Co., Richmond, Ind.  
S. Obermayer Co., Cincinnati, O.  
Rice Mfg. Co., New Durham, N. H.  
Smith, J. D., Fdy. Supply Co., Cinn., O.
- Friction Clutches.**  
Brown, A. & F., 17 Dey St., N. Y.  
Keystone Clutch & Mch. Wks., Phila., Pa.  
Moore & White Co., Philadelphia, Pa.
- Furnaces, Foundry.**  
Byram & Co., Detroit, Mich.
- Gages.**  
Leavitt Mch. Co., Orange, Mass.
- Galvanized Material.**  
Jersey City Galvanizing Co., 112 John St., N. Y.
- Galvanizing Kettles.**  
Sands, Thos., Nashua, N. H.
- Galvanizing and Tinning.**  
Wilcox, Crittenden & Co., Middletown, Conn.
- Gas Producers.**  
Wood, R. D. & Co., Philadelphia, Pa.
- Gas Stoves.**  
Bolgiano Mfg. Co., Baltimore, Md.
- Gas and Steam Fitters' Supplies.**  
Pancoast, Henry B. & Co., Phila., Pa.
- Gate Hinges.**  
Wrightsville Hdw. Co., Wrightsville, Pa.
- Gear Cutters.**  
D. E. Whiton Mach. Co., New London, Conn.
- Gears.**  
Boston Gear Works, Boston, Mass.  
Lincoln Iron Works, Rutland, Vt.  
Poole, Robt. & Son Co., Baltimore, Md.  
U. S. Projectile Co., Brooklyn, N. Y.
- Glass Boards.**  
Canton Saw Co., Canton, O.  
Lutkin Rule Co., Saginaw, Mich.
- Glass Cutters.**  
Monce, S. G., Bristol, Conn.
- Glaziers' Points.**  
Shelton Co., Birmingham, Conn.
- Glue.**  
Baeder, Adamson & Co., Phila., Pa.  
Dodd, A. W. & Co., Gloucester, Mass.  
Russia Cement Co., Gloucester, Mass.
- Grass Catchers.**  
Supplee Hardware Co., Phila., Pa.
- Grinding Mills.**  
Foss Mfg. Co., Springfield, O.
- Grinding and Polishing Machines.**  
Cutter, Wood & Stevens, Boston, Mass.  
Diamond Mach. Co., Providence, R. I.  
Norton Emery Wheel Co., Worcester, Mass.
- Grindstone Dressing Machinery.**  
Blake & Johnson, Waterbury, Conn.
- Grindstones.**  
Cleveland Stove Co., Cleveland, O.
- Gun Implements.**  
Bridgeport Gun Implement Co., 313-315 Broadway, N. Y.
- Gunpowder, Makers of.**  
Lafin & Rand Powder Co., 29 Murray St., N. Y.
- Gymnasium Supplies.**  
Independent Electric Co., Chicago, Ill.
- Handles.**  
Cleveland Wood Turning Co., Cleveland, O.
- Hangers, Door.**  
Chicago Spring Butt Co., Chicago, Ill.  
Coburn Trolley Track Mfg. Co., Holyoke, Mass.  
Lane Bros., Poughkeepsie, N. Y.
- Hardware Commission Merchants.**  
Graham, John H. & Co., 111 Chambers St., New York.  
Jacobus, W. H., 90 Chambers, N. Y.
- Hardware Drawers.**  
Wernicke Co., Minneapolis, Minn.
- Hardware Jobbers.**  
White, Van Glahn & Co., 15-17 Chatham Square, N. Y.
- Hardware Manufacturers.**  
Allentown Hardware Works, Allentown, Pa.  
Stearns, E. C. & Co., Syracuse, N. Y.  
Streeter, N. R. & Co., Groton, N. Y.  
Union Mfg. Co., 103 Chambers, N. Y.  
Yale & Towne Mfg. Co., Stamford, Conn.
- Hardware Mfrs. Agents.**  
Bingham, W. Co., Cleveland, O.  
Clarke, Thomas, St. John, N. B.  
Graham, John H. & Co., 113 Chambers.  
Sickles, Sweet & Lyon, 35 Barclay, N. Y.
- Hardware Specialties.**  
Acme Shear Co., Bridgeport, Conn.  
Berger Bros., Philadelphia, Pa.  
Enterprise Mfg. Co., Philadelphia, Pa.  
Ette & Henger Mfg. Co., St. Louis, Mo.  
Johnson, S. C., Racine, Wis.  
North Bros. Mfg. Co., Philadelphia, Pa.  
Ransom Hdw. Co., Burlington, Vt.  
Scranton & Co., New Haven, Conn.  
Union Lock & Hdw. Co., Lancaster, Pa.  
Wilson, J. Fred., Worcester, Mass.  
Wrightsville Hdw. Co., Wrightsville, Pa.
- Harness Snaps.**  
Covert Mfg. Co., West Troy, N. Y.  
Coverts' Saddlery Wks., Farmer, N. Y.  
Fitch, W. & E. T., New Haven, Conn.
- Hay Tools.**  
Myers, F. E. & Bro., Ashland, O.
- Hoes.**  
Iowa Farming Tool Co., Ft. Madison, Iowa.  
Withington & Cooley Mfg. Co., Jackson, Mich.
- Hog Rings and Ringers.**  
Oakes & Irwin, Decatur, Ill.
- Hoisting Machines.**  
Box, Alfred & Co., 314 Green, Phila.  
Leon, Hoisting & Conveying Mch. Co., Cleveland, Ohio.  
Byers, Jno. F. Mch. Co., Ravenna, O.  
Fulton Iron & Engine Wks., Detroit, Mich.  
Harrington, E. Son & Co., Phila.  
Lane Bros., Poughkeepsie, N. Y.  
Lynch, Geo. Mfg. Co., 36 Liberty, N. Y.  
Lincoln Iron Works, Rutland, Vt.  
McCoy, Jos. F. & Co., 26 Warren St.  
Maris & Beekley, Philadelphia.  
Moore Mfg. & Fdy. Co., Milwaukee, Wis.  
Morse, Williams & Co., Phila.  
Sellers, Wm. & Co., Phila. and N. Y.  
Speidel, J. G., Reading, Pa.  
Yale & Towne Mfg. Co., Stamford, Ct.
- Hollow Ware.**  
Avery Stamping Co., Cleveland, O.  
Bronson Supply Co., Cleveland, Ohio.  
Cleveland Stamping & Tool Co., Cleveland, Ohio.  
Stuart & Peterson Co., Phila., Pa.
- Horse Clippers.**  
Gillette Clipping Machine Co., 201 E. 23d St., N. Y.
- Horse Nails, Makers of.**  
Capewell Horse Nail Co., Hartford, Conn.  
National Horse Nail Co., Vergennes, Vt.  
Putnam Nail Co., Neponset, Boston, Mass.
- Horse and Mule Shoes, Makers of.**  
Bryden Horse Shoe Co., Catsauqua, N. Y.  
Burden Iron Co., Troy, N. Y.  
Crescent Horse Shoe & Iron Co., Max Meadows, Va.  
Leonard, J., 440 West St., N. Y.  
Old Dominion Iron & Nail Works Co., Richmond, Va.  
Phoenix Horse Shoe Co., Poughkeepsie, N. Y.  
Rhode Island Perkins Horse Shoe Co., Providence.  
Shoenberger & Co., Pittsburgh, Pa.  
Standard Horse Shoe Co., Boston, Mass.
- Rose.**  
Cleveland Rubber Works, Cleveland, O.  
N. Y. Belting & Packing Co., Ltd., 15 Park Row, N. Y.
- Hydrants, &c.**  
McLean, John, 296 & 298 Monroe, N. Y.
- Hydraulic Forging.**  
U. S. Projectile Co., Brooklyn, N. Y.
- Hydraulic Jacks.**  
Dudgeon, Richard, 24 Columbia, N. Y.  
McCoy, Jos. F. Co., 26 Warren St., N. Y.
- Ice Cream Freezers.**  
White Mountain Freezer Co., Nashua, N. H.
- Injectors.**  
Eynon-Evans Mfg. Co., Philadelphia, Pa.  
Jenkins Bros., New York.
- Insurance, Boiler.**  
Hartford Steam Boiler Inspection & Insurance Co., Hartford, Conn.
- Iron and Steel, Swedish.**  
Lundberg, Gustaf, Boston, Mass.  
Milne, A. & Co., 1 Broadway, N. Y.
- Iron Commission Brokers.**  
Butze, Adolph, St. Louis, Mo.  
Corning, Edw. & Co., 29 B'way, N. Y.  
Cotton, Barclay W. & Co., Phila.  
Etting, Edw. J., Philadelphia.  
Hogan, John L. & Co., Philadelphia, Pa.  
Hoffman, J. J. & Co., Philadelphia.  
Levis, Henry & Co., Philadelphia.  
Keeley, Jerome & Co., Philadelphia.  
Lea, J. Tatnall & Co., Philadelphia.  
Mohr, J. J., 430 Walnut, Philadelphia.  
Pilling & Crane, Philadelphia, Pa.  
Wister, L. R. & Co., Phila., Pa.
- Iron Ore.**  
Samuel, Frank, Philadelphia, Pa.
- Iron Merchants.**  
Barns, C. K. & Co., Philadelphia, Pa.  
Borden & Lovell, 70 West, N. Y.  
Bussenden & Cunliffe, Philadelphia.  
Corning, Edw. & Co., 29 B'way, N. Y.  
Cox, Justice, Jr., Philadelphia.  
Cotton, Barclay W. & Co., Phila.  
Hoffman, J. W. & Co., Philadelphia.  
Leonard, J., 440 West St., N. Y.  
Nicolls, Wheeler & Co., Philadelphia.  
Ogden & Wallace, 577 to 583 Greenwich St., N. Y.
- Pierson & Co., 29 Broadway, N. Y.**  
Thomson, W. H. & Co., Phila., Pa.  
Wallace, Wm. H. & Co., 66 B'way, N. Y.  
Whitney, A. R. & Co., 17 B'way, N. Y.  
Wilson, E. H. & Co., Philadelphia.
- Iron, Importers.**  
Abbott, Wheelock & Co., N. Y. and Boston.  
Lundberg, Gustaf, Boston, Mass.
- Iron Sheet, Manufacturers of.**  
Cambridge Iron & Steel Co., Cambridge, Ohio.  
W. Dewees Wood Co., Lim., McKeesport, Pa.
- Ironwork, Ornamental.**  
Barnum, E. T., Detroit, Mich.  
Champion Iron Co., Kenton, O.  
Ludlow-Saylor Wire Co., St. Louis, Mo.  
The Van Dorn Iron Works Co., Cleveland, O.
- Keys.**  
Wollensak, J. F., Chicago, Ill.
- Ladies.**  
Whiting Fdy. Equipment Co., Chicago, Ill.
- Lanterns.**  
Steam Gauge & Lantern Co., Syracuse, N. Y.
- Lasts.**  
Kupferle, Jno. C., St. Louis, Mo.
- Lathes.**  
Beaman & Smith, Providence, R. I.  
Dietz, Schumacher & Co., Cincinnati, O.  
Draper Machine Tool Co., Worcester, Mass.  
Harrington, E. Son & Co., Phila., Pa.  
Johnson, Israel H., Jr., & Co., Philadelphia, Pa.  
New Haven Mfg. Co., New Haven, Conn.  
Sebastian Cloth Co., Cincinnati, O.  
Seneca Falls Mfg. Co., Seneca Falls, N. Y.
- Lathing, Expanded Metal.**  
Chess Bros., Pittsburgh, Pa.
- Lathing, Wire.**  
Clinton Wire Cloth Co., Clinton, Mass.  
N. J. Wire Cloth Co., Trenton, N. J.  
Wright & Colton Wire Cloth Co., Worcester, Mass.
- Lawn Mowers.**  
Anderson, F. S. & Co., Richmond, Ind.  
Blair Mfg. Co., Springfield, Mass.  
Chadborn & Coldwell Mfg. Co., Newburgh, N. Y.  
Coldwell Lawn Mower Co., Newburgh, N. Y.  
Dille & McGuire Mfg. Co., Richmond, Ind.  
F. & N. Mfg. Co., Richmond, Ind.  
Henley, M. C., Richmond, Ind.  
Supplee Hdw. Co., Phila., Pa.
- Lawn Rakes.**  
Gibbs Mfg. Co., Canton, Ohio.  
Kohler, F. E. & Co., Canton, O.
- Lawn Sprinklers.**  
Blair Mfg. Co., Springfield, Mass.  
Ette & Henger Mfg. Co., St. Louis, Mo.  
McGowan, John H. Co., Cincinnati, O.
- Letters and Figures, Metallic.**  
White, A. A. & Co., Providence, R. I.
- Letters, Paper.**  
Tablet & Ticket Co., Chicago, Ill.
- Levels.**  
Richardson, C. F. & Son, Athol, Mass.
- Locks and Knobs, Manufacturers of.**  
Dietz, A. E., 97 Chambers, N. Y.  
Reading Hdw. Co., Reading, Pa.  
Smith & Egge Mfg. Co., Bridgeport, Conn.  
Warner Lock Co., Chicago, Ill.  
Yale & Towne Mfg. Co., Stamford, Conn.
- Lubricants.**  
Dixon, Jos., Crucible Co., Jersey City, N. J.
- Machinery.**  
Am. Tool Works, Cleveland, Ohio.  
Ayer, H. C. & Gleason Co., Phila., Pa.  
Barnes, W. F. & John, Rockford, Ill.  
Beaman & Smith, Providence, R. I.  
Bement, Miles & Co., Philadelphia, Pa.  
Bigelow, C. E., 45 Dey, N. Y.  
Birkall & Keeler Mfg. Co., St. Louis.  
Bliss, E. W. Co., Brooklyn, N. Y.  
Briggs, Marvin, 12 Broadway, N. Y.  
Bulard Mch. Tool Co., Bridgeport, Conn.  
Carlin's Sons, Thos., Allegheny, Pa.  
Clapp, Geo. M., agt., 74 Cortlandt, N. Y.  
Detrick & Harvey Mch. Co., Baltimore, Md.  
Dietz, Schumacher & Co., Cincinnati, Ohio.  
Fitchburg Mch. Works, Fitchburg, Mass.  
Garvin Mch. Co., Laight & Canal Sts.  
Gould & Eberhardt, Newark, N. J.  
Hamilton Mch. Tool Co., Hamilton, O.  
Harrington, E. Son & Co., Phila., Pa.  
Hartford Machine Screw Co., Hartford, Conn.  
Hendey Machine Co., Torrington, Ct.  
Hill, Clarke & Co., Boston, Mass.  
Howard & Morse, 46 Fulton St., N. Y.  
Johnson, Israel H., Jr., & Co., Phila.  
Jones & Lamson Mch. Co., Springfield, Vt.  
Lodge & Davis Mch. Tool Co., Cincinnati, O.  
Lodge & Shipley Mch. Tool Co., Cincinnati, O.  
McCabe, J. J., 68 Cortlandt, N. Y.  
Machinery's Supply Co., Rochester, N. Y.  
Marville, E. J., Mch. Co., Waterbury, Conn.  
Newark Mch. Tool Wks., Newark, N. J.  
New Haven Mfg. Co., New Haven, Ct.  
New York Machinery Depot, 175 Broadway, New York.  
Niles Tool Wks., 138 Liberty St., N. Y.  
Pittsburgh Mfg. Co., Pittsburgh, Pa.

Place, Geo., 145 Broadway, N. Y.  
 Poole, Robt. & Son Co., Baltimore, Md.  
 Powell Planer Co., Worcester, Mass.  
 Prentiss Tool & Supply Co., N. Y.  
 Scranton Supply & Mchry. Co., Scranton, Pa.

Sellers, Wm. & Co., Phila.  
 Seyfert's Sons, L. F., Philadelphia, Pa.  
 Sigourney Tool Co., Hartford, Conn.  
 Steptoe, J. & Co., Cincinnati, O.  
 Stow Flexible Shaft Co., Ltd., Phila.  
 Toomey, Frank, Philadelphia, Pa.  
 Walker Mfg. Co., Cleveland, O.  
 Wetherill, Robert & Co., Chester, Pa.  
 Wilson, W. A., Rochester, N. Y.

**Machinery for Hardware Manufacturers.**  
 Att. Jno. & Son, New Haven, Conn.

**Machine Knives.**  
 Loring, Coes & Co., Worcester, Mass.  
 Loyd, John, 558-562 Water St., N. Y.  
 Simonds Mfg. Co., Fitchburg, Mass.

**Machine Screws.**  
 Hubbell, Harvey, Bridgeport, Ct.  
 Rhode Island Tool Co., Providence, R.I.

**Machine Tools.**—See Machinery.

**Machine Work.**  
 Papping, J., 58th St. & 11th Ave., N. Y. City.

**Machinists' Scales.**  
 Coffin & Leighton, Syracuse, N. Y.  
 Starrett, L. S., Athol, Mass.

**Machinists' Tools and Supplies.**  
 Kling, J. M. & Co., Watford, N. Y.  
 Sellers, Wm. & Co., Inc., Phila.

**Manufacturing Sites.**  
 Chickens, Milwaukee & St. Paul R. R., Chicago, Ill.

**Measuring Tapes.**  
 Lufkin Rule Co., Saginaw, Mich.

**Meat Choppers.**  
 Enterprise Mfg. Co., Philadelphia, Pa.

**Meat Cutters.**  
 North Bros. Mfg. Co., Philadelphia, Pa.

**Mechanical Instruction.**  
 Correspondence School of Mechanics, Scranton, Pa.

**Metals.**  
 Fearing, Wm. S., 100 Chambers, N. Y.  
 Hendricks Bros., 49 Cliff, N. Y.

**Metal Brokers.**  
 American Metal Co., N. Y.

**Metal Saws.**  
 Q. & C. Co., Chicago, Ill.

**Metalurgists.**  
 Britton, J. Blodgett, Phila., Pa.

**Mining Knives.**  
 Palmer Edw. Mfg. Co., Troy, N. Y.  
 Streeter, N. R. & Co., Groton, N. Y.

**Mine Lamps.**  
 Darby, Edw. & Sons, Phila., Pa.  
 Leonard, B. E., Scranton, Pa.

**Mining Screens.**  
 Harrington & King Perforating Co., Chicago, Ill.  
 Howard & Morse, 45 Fulton, N. Y.

**Mining Machinery.**  
 Allis, E. P. Co., Milwaukee, Wis.

**Models, Makers of.**  
 Ideal Machine Works, Hartford, Conn.

**Molding Sand.**  
 Obermayer, S. Co., Cincinnati, O.

**Motors, Water and Electric.**  
 Bolgiano Mfg. Co., Baltimore, Md.  
 Q. & C. Electric Co., 402 and 404 Greenwich St., N. Y.  
 Dallett, Thomas H. & Co., Phila., Pa.

**Nail Machinery.**  
 Pittsburgh Mfg. Co., Pittsburgh, Pa.

**Nail and Tack Pullers.**  
 Am. Specialty Co., Hartford, Conn.  
 Scranton & Co., New Haven, Conn.

**Nails (Cut) and Spikes.**  
 Borden & Lovell, 70 West, N. Y.  
 Pottstown Iron Co., Pottstown, Pa.  
 Riverside Iron Wks., Wheeling, W. Va.  
 Valley Steel Co., St. Louis, Mo.

**Nickel Plated Supplies.**  
 Eddy Electric Mfg. Co., Windsor, Conn.

**Norway Shapes, Rollers of.**  
 Rowland, William & Harvey, Frankford, Philadelphia.

**Novelty Manufacturers.**  
 Ideal Machine Works, Hartford, Conn.

**Nut Machines.**  
 Dunham Nut Co., Unionville, Ct.

**Nuts, Bolts, & Co., Makers of.**  
 American Bolt Co., Lowell, Mass.  
 American Screw Co., Providence, R. I.  
 Blake & Johnson, Waterbury, Conn.  
 Dunham Nut Co., Unionville, Conn.  
 Haskell, Wm. H. Co., Pawtucket, R. I.  
 Mt. Carmel Bolt Co., Mt. Carmel, Conn.  
 Pennsylvania Bolt & Nut Co., Lebanon, Pa.  
 Port Chester Bolt & Nut Co., Port Chester, N. Y.  
 Rhode Island Tool Co., Providence, R. I.  
 Russell, Burdall & Ward, Port Chester, N. Y.  
 Stenberg, J. H. & Son, Reading, Pa.  
 Wilson, J. Fred., Worcester, Mass.  
 Wm. H. Haskell Co., Pawtucket, R. I.

**Oil Heaters.**  
 Wilnot & Hobbs Mfg. Co., Bridgeport, Conn.

**Oilless Anti-Friction Metals.**  
 North American Metalline Co., Long Island City, N. Y.

**Oil Stones.**  
 Pike Mfg. Co., Pike Station, N. H.

**Ores.**  
 Wister, Francis, Philadelphia, Pa.

**Ox Shoes.**  
 Millers Falls Co., 98 Reade St., N. Y.  
 Scranton Forging Co., Scranton, Pa.

**Packing.**  
 Morrison, Robert, St. Louis, Mo.  
 N. Y. Belting & Packing Co., Ltd., N. Y.

**Padlocks.**  
 Ames Sword Co., Chicopee, Mass.  
 Fraim, E. T., Lancaster, Pa.  
 Union Lock & Hdw. Co., Lancaster, Pa.  
 Wolf, W. & L., Phila., Pa.

**Pails.**  
 Richmond Cedar Wks., Richmond, Va.

**Paint.**  
 Garry Iron & Steel Roofing Co., Cleveland, O.

**Paint Burners.**  
 Dangler Stove & Mfg. Co., Cleveland, Ohio.

**Paint Cans.**  
 Wilnot & Hobbs Mfg. Co., Bridgeport, Conn.

**Pants Stretcher.**  
 Covert Mfg. Co., West Troy, N. Y.

**Patent Solicitors.**  
 Butler, C. N., Phila., Pa.  
 Jenner, H. W. T., Washington, D. C.  
 Howson & Howson, Philadelphia and Washington

**Pattern Letters.**  
 Wells, Heber, 167 William St., N. Y.

**Perforated Metal.**  
 Clinton Wire Cloth Co., Clinton, Mass.  
 Harrington & King Perforating Co., Chicago, Ill.

**Perforated Metal.**  
 Hendrick Mfg. Co., Ltd., Carbondale, Pa.

**Phosphor Bronze.**  
 Phosphor Bronze Smelting Co., Limited, Philadelphia.

**Phosphor Tin.**  
 Crescent Phosphorized Metal Co., Philadelphia, Pa.  
 Halk & Naumann, 516 Pearl, N. Y.

**Picks and Mattocks.**  
 Plumb, Fayette R., Philadelphia, Pa.

**Pig Iron.**  
 Houston, C. B. & Co., Philadelphia, Pa.  
 Montour Iron & Steel Co., Danville, Pa.  
 Naylor & Co., 45 Wall, N. Y.  
 Pilling & Crane, Philadelphia, Pa.  
 Samuel, Frank, Philadelphia, Pa.

**Pig Iron Storage.**  
 Am. Pig Iron Storage Warrant Co., 44 Wall, N. Y.

**Pile Drivers.**  
 Vulcan Iron Works, Chicago, Ill.

**Pipe, Bent.**  
 National Pipe Bending Co., New Haven, Conn.

**Pipe Cutting and Threading Machines.**  
 Armstrong Mfg. Co., Bridgeport, Conn.  
 Bignall & Keeler Mfg. Co., St. Louis, Mo.  
 Detrick & Harvey Mch. Co., Baltimore, Md.  
 Merrill Mfg. Co., Toledo, O.  
 Fancoast, Henry B. & Co., Phila.  
 Saunders' Sons, D., Yonkers, N. Y.  
 Walworth Mfg. Co., Boston, Mass.

**Pipe Grips.**  
 Prentiss Vise Co., 44 Barclay, N. Y.

**Pipes, Fittings, & Co., Makers of.**  
 McNab & Harlin Mfg. Co., N. Y.

**Pipe, Water and Gas, Makers of.**  
 Donaldson Iron Co., Emaus, Pa.  
 Riverside Iron Works, Wheeling, W. Va.  
 Wood, R. D. & Co., Philadelphia, Pa.

**Plane Irons, Manufacturers of.**  
 Buck Bros., Millbury, Mass.  
 Buck, Chas., Millbury, Mass.

**Planers.**  
 Detrick & Harvey Mch. Co., Baltimore, Md.  
 New Haven Mfg. Co., New Haven, Conn.  
 Powell Planer Co., Worcester, Mass.  
 Wilson, W. A., Worcester, Mass.

**Planes, Manufacturers of.**  
 Stanley Rule & Level Co., N. Y.

**Plated Ware.**  
 Boardman, L. & Son, New Haddam, Ct.  
 Holmes & Edwards Silver Co., Bridgeport, Conn.  
 Rogers, Wm. Mfg. Co., Hartford, Ct.

**Plate, Iron and Steel, Mfrs. of.**  
 Aetna-Standard Iron & Steel Co., Bridgeport, O.  
 Luken's Iron & Steel Co., Coatesville, Pa.  
 Mahoning Valley Iron Co., Youngstown, Ohio.  
 Moorhead-McLean Co., Pittsburgh, Pa.  
 McIlvain & Sons, Reading, Pa.  
 Pottstown Iron Co., Pottstown, Pa.  
 Pottsville Iron & Steel Co., Pottsville, Pa.  
 Singer, Nimble & Co., Pittsburgh, Pa.  
 The Mahoning Valley Iron Co., Youngstown, O.  
 Wood, Alan Co., Philadelphia.

**Plating, Nickel, Brass and Silver.**  
 Wilnot & Hobbs Mfg. Co., Bridgeport, Conn.

**Polishing Machines.**  
 Watson & Stillman, 204 E. 43d, N. Y.

**Post Hole Diggers.**

Gibbs Mfg. Co., Canton, Ohio.  
 Kohler, F. E. & Co., Canton, O.

**Poultry Nettings.**

Barum, E. T., Detroit, Mich.  
 Gilbert & Bennett Mfg. Co., 42 Cliff St., N. Y.  
 N. J. Wire Cloth Co., Trenton, N. J.  
 "Silver Finish."  
 Tyler Wire Works Co., W. S., Cleveland, O.  
 Wright & Colton Wire Cloth Co., Worcester, Mass.

**Powder.**  
 Laffin & Rand Powder Co., 29 Murray, New York Powder Co., 62 Liberty St., N. Y.

**Power Hammers.**  
 Dlenelt & Eisenhardt, Philadelphia.  
 Dupont Mfg. Co., St. Johnsbury, Vt.  
 Jenkins & Lingle, Bellefonte, Pa.  
 Miner & Peck Mfg. Co., New Haven, Conn.  
 Scranton & Co., New Haven, Conn.

**Power Transmitting Machinery.**  
 Dodge Mfg. Co., Mishawaka, Ind.

**Presses, Dies, & Co.**  
 E. W. Bliss Co., Brooklyn, N. Y.  
 Crosby, G. A. & Co., Chicago, Ill.  
 Stiles & Parker Press Co., Brooklyn, N. Y.  
 Waterbury Mch. Co., Waterbury, Ct.

**Presses, Power, Makers of.**  
 Bliss, E. W. Co., Brooklyn, N. Y.  
 Manville, E. J. Mch. Co., Waterbury, Ct.  
 Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.

**Pressure Regulators.**  
 Newark Regulator Co., Newark, O.

**Printing and Embossing.**  
 Griffith, Axtell & Cady Co., Holyoke, Mass.

**Pulleys.**  
 Brown, A. & F., 17 Dey St., N. Y.  
 Dodge Mfg. Co., Mishawaka, Ind.  
 Keystone Clutch Mch. Wks., Phila., Pa.  
 Reading Wood Pulley Co., Reading, Pa.

**Pumping Machinery.**  
 Dean Bros. Steam Pump Works, Indianapolis, Ind.  
 Goulds Mfg. Co., Seneca Falls, N. Y.  
 Hooker-Corville Steam Pump Co., St. Louis, Mo.  
 McGowan, J. H. & Co., Cincinnati, O.  
 Maslin, J. & Son, Jersey City, N. J.  
 Norwalk Iron Works Co., So. Norwalk, Conn.  
 Southwark Fdy. & Mch. Co., Phila., Pa.  
 Valley Pump Works, Easthampton, Mass.  
 Worthington, Henry R., 86 and 88 Liberty St., N. Y.

**Pumps, Makers of.**  
 Denning Co., Salem, O.  
 Douglas, W. & B., Middletown, Conn.  
 Goulds Mfg. Co., Seneca Falls, N. Y.  
 Millar, C. & Sons, Utica, N. Y.  
 Myers, F. E. & Bro., Ashland, O.  
 Peters Pump Co., Kewanee, Ill.  
 Red Jacket Mfg. Co., Davenport, Iowa.

**Punches.**  
 Richards, I. P., Providence, R. I.

**Punches and Shears, Hand and Power.**  
 E. W. Bliss Co., Brooklyn, N. Y.  
 Crosby, G. A. & Co., Chicago, Ill.  
 Stiles & Parker Press Co., Brooklyn, N. Y.  
 Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.  
 Watson & Stillman, 204 E. 43d, N. Y.

**Rails, Old and New.**  
 Perry, W. H. & Co., Providence, R. I.

**Rat and Mouse Traps.**  
 Burditt & Williams, Boston, Mass.  
 Estey, W. S., 65 Fulton, N. Y.  
 Excelsior Cutlery Co., Worcester, Mass.

**Razors, Manufacturers of.**  
 Millbury Razor Co., Millbury, Mass.

**Reducing Valves.**  
 D'Este & Seelye Co., Boston, Mass.

**Reels.**  
 Hendryx, A. B. Co., New Haven, Conn.

**Refrigerator Door Fasteners.**  
 Conroy, P. J. & Co., Philadelphia.

**Rivers.**  
 Blake & Johnson, Waterbury, Conn.  
 Burden Iron Co., Troy, N. Y.  
 Clark & Cowles, Plainville, Conn.  
 Cobb & Drew, Plymouth, Mass.  
 Stenberg, J. H. & Son, Reading, Pa.  
 Townsend, W. F. & Co., New Brighton, Pa.

**Riveting Machines.**  
 Adt. Jno. & Sons, New Haven, Conn.

**Rolling Mill Machinery.**  
 Birmingham Iron F'dry, Birmingham, Conn.  
 Booth, The Lloyd Co., Youngstown, O.  
 Lechburg Foundry & Mch. Co., Pittsburgh, Pa.  
 Morgan Construction Co., Worcester, Mass.  
 Robinson-Rea Mfg. Co., Pittsburgh.  
 Totten & Hogg Iron and Steel F'dry Co., Pittsburgh, Pa.  
 Tretheway Mfg. Co., Pittsburgh, Pa.  
 Waterbury Farrel Foundry & Mch. Co., Waterbury, Conn.

**Rolls, Chilled, Sand and Steel.**

Birmingham Iron Foundry, Birmingham, Conn.  
 Booth, The Lloyd Co., Youngstown, O.  
 East Chicago F'dry Co., Chicago, Ill.  
 Garrison, A. F'dry Co., Pittsburgh, Pa.  
 Robinson-Rea Mfg. Co., Pittsburgh, Pa.  
 Seaman, Sleeth & Blais, Pittsburgh, Pa.  
 Totten & Hogg Iron and Steel F'dry Co., Pittsburgh, Pa.

**Roofing.**  
 Berlin Iron Bridge Co., E. Berlin, Conn.  
 Cincinnati Corrugating Co., Piqua, O.  
 N. Y. Iron Roofing & Corrugating Co., Jersey City, N. J.

**Rope and Web Goods.**  
 Covert Mfg. Co., West Troy, N. Y.  
 Covert's Saddlery Wks., Farmer, N. Y.

**Rope Wheels.**  
 Cresson, Geo. V. Co., Philadelphia, Pa.

**Rubber Goods.**  
 Canfield, H. O., Bridgeport, Conn.

**Rules, Manufacturers of.**  
 Stanley Rule & Level Co., 29 Chambers, Stephens & Co., Riverton, Conn.

**Sad Irons.**  
 Enterprise Mfg. Co., Phila., Pa.  
 Streeter, N. R. & Co., Groton, N. Y.

**Sad Irons, Gas.**  
 Bolgiano Mfg. Co., Baltimore, Md.

**Sand Paper.**  
 Baeder, Adamson & Co., Phila., Pa.

**Sash Balances.**  
 Caldwell Mfg. Co., Rochester, N. Y.  
 Pullman Sash Balance Co., Rochester, N. Y.

**Sash Cords and Chains.**  
 Morton, Thos., 65 Elizabeth, N. Y.  
 Samson Cordage Works, Boston, Mass.  
 Smith & Egge Mfg. Co., Bridgeport.

**Sash Pulleys.**  
 Palmer Hardware Mfg. Co., Troy, N. Y.

**Sash Weights.**  
 Brown, E. E. & Co., Philadelphia, Pa.  
 Kings County Iron Foundry, Brooklyn, N. Y.  
 Norton Bros., Chicago, Ill.

**Saw Filing Machines.**  
 Diston, Henry & Sons, Philadelphia, Pa.

**Saws, Makers of.**  
 Atkins, E. C. & Co., Indianapolis, Ind.  
 Diston, Henry & Sons, Phila., Pa.  
 National Saw Co., Newark, N. J.  
 Simonds Mfg. Co., Fitchburg, Mass.

**Saw Sets.**  
 Taintor Mfg. Co., 84-86 Chambers, N. Y.

**Saw Vises.**  
 Seneca Falls Mfg. Co., Seneca Falls, N. Y.

**Sawing Machines.**  
 Q. & C. Co., Chicago, Ill.

**Scales, Manufacturers of.**  
 Buffalo Scale Co., Buffalo, N. Y.  
 Chatillon, John & Sons, 85-89 Cliff, N. Y.  
 Standard Scale & Fixtures Co., St. Louis, Mo.

**Scrapers, Road.**  
 Sidney Steel Scraper Co., Sidney, O.

**Screens, Coal and Ore.**  
 Hendrick Mfg. Co., Ltd., Carbondale, Pa.

**Screw Cutting Machinery.**  
 Wells Bros. & Co., Greenfield, Mass.  
 Wiley & Russell Mfg. Co., Greenfield, Mass.

**Screw Drivers.**  
 Brown, R. H. & Co., New Haven, Conn.  
 Mayhew, H. H. Co., Shelburne Falls, Mass.

**Screw Machinery.**  
 Hartford Machine Screw Co., Hartford, Conn.

**Screw Plate and Pipe Cutter.**  
 Jarecki Mfg. Co., Erie, Pa.

**Screws, Makers of.**  
 American Screw Co., Providence, R. I.  
 Blake & Johnson, Waterbury, Conn.  
 Wm. H. Haskell Co., Pawtucket.  
 Miles, F. S., 206 Quarry, Philadelphia.  
 Reynolds & Co., New Haven, Conn.  
 Worcester Machine Screw Co., Worcester, Mass.

**Scroll Saws.**  
 Barnes, W. F. & John, Rockford, Ill.  
 Seneca Falls Mfg. Co., Seneca Falls, N. Y.

**Scythe Stones and Whetstones.**  
 Pike Mfg. Co., Pike Station, N. H.  
 Cleveland Stone Co., Cleveland, O.

**Sewer Pipes.**  
 Sharon Clay Mfg. Co., Sharon, Pa.

**Shade Hangers.**  
 South, W. A. Co., Salem, Mass.

**Shafting, Makers of.**  
 Brown, A. & F., 17 Dey St., N. Y.  
 Cresson, Geo. V. Co., Philadelphia, Pa.  
 Fairmount Mch. Co., Philadelphia, Pa.  
 Sellers, Wm. & Co., Inc., Phila., Pa.  
 Stow Mfg. Co., Banghamton, N. Y.

**Shaft Support.**  
 Decatur Shaft Support Co., Decatur, Ill.

**Shaped Iron and Steel, Manufacturers of.**  
 Aetna-Standard Iron & Steel Co., Bridgeport, O.  
 East Chicago F'dry Co., Chicago, Ill.

- Allentown Rolling Mill, Allentown, Pa.**  
Lockhart Iron & Steel Co., Pittsburgh, Pa.
- Passaic Rolling Mill Co., Paterson, N.J.**  
The Phoenix Iron Co., Phila., Pa.  
Pottsville Iron & Steel Co., Pottsville, Pa.  
Roberts, A. & P. & Co., Phila., Pa.
- Shears and Scissors.**  
Acme Shear Co., Bridgeport, Conn.  
Claus Shear Co., Fremont, Ohio.  
Heinrichs, R. Sons Co., Newark, N. J.
- Sheet Iron and Steel, Manufacturers of.**  
Aetna-Standard Iron and Steel Co., Bridgeport, O.  
Cambridge Iron & Steel Co., Cambridge, Ohio.  
Jersey City Galvanizing Co., 112 John St., N. Y.  
Mahoning Valley Iron Co., Livingston, Ohio.  
Morehead-McCleane Co., Pittsburgh, Pa.  
Pierston & Co., 29 Broadway, N. Y.  
Singer, Nimick & Co., Ltd., Pittsburgh, Pa.  
The Mahoning Valley Iron Co., Youngstown, O.  
Alan Wood Co., Philadelphia.  
W. Dewees Wood Co., McKeesport, Pa.
- Sheet Zinc.**  
Mathiessen & Hegeler Zinc Co., La Salle, Ill.
- Shelf Brackets.**  
Atlas Mfg. Co., New Haven, Conn.  
Stanley Works, New Britain, Conn.
- Shoe Stands.**  
Kupferle, Jno. C., St. Louis, Mo.
- Show Cases.**  
Union Show Case Co., Chicago, Ill.
- Sinks.**  
Douglas, W. & B., Middletown, Conn.
- Skate Grinding Machinery.**  
Perkins, Chas., Bridgewater, Mass.
- Skates, Ice.**  
Barney & Berry, Springfield, Mass.  
Dame, Stoddard & Kendall, Boston, Mass.  
Graham, John H. & Co., 113 Chambers Street, N. Y.  
Keene Mfg. Co., Keene, N. H.  
Winslow, Sam'l, Skate Mfg. Co., Worcester, Mass.
- Skates, Roller.**  
Henley, M. C., Richmond, Ind.  
Winslow, Sam'l, Skate Mfg. Co., Worcester, Mass.
- Slag Machines.**  
Cambria Iron Co., Johnstown, Pa.
- Slaw Cutters.**  
Tucker & Dorsey Mfg. Co., Indianapolis, Ind.
- Smelting Works.**  
Reeves, Paul S., 760 S. Broad, Phila.
- Soldering Coppers.**  
Clendenin Bros., Baltimore, Md.  
Covert Mfg. Co., West Troy, N. Y.
- Speaking Tubes.**  
Ostrander, W. R. & Co., 204 Fulton St., N. Y.  
Wollensak, J. F., Chicago, Ill.
- Special Machinery.**  
Rhodes, L. E. Co., Hartford, Conn.
- Spelter.**  
Mathiessen & Hegeler Zinc Co., La Salle, Ill.
- Spoons and Forks.**  
Boardman, L. & Son, New Haddam, Conn.  
Holmes & Edwards Silver Co., Bridgeport, Conn.  
Rogers, The Wm. Mfg. Co., Hartford, Conn.
- Sporting Goods.**  
Hartley & Graham, 313-315 B'way, N. Y.  
Schoverling, Daly & Gales, 302 Broadway, N. Y.
- Springs.**  
Clark & Cowles, Plainville, Ct.  
Coiled Wire Belting Co., Jersey City, N. J.  
Dunbar Bros., Bristol, Conn.  
Miller & Van Winkle, Brooklyn, N. Y.  
Morgan Spring Co., Worcester, Mass.  
Roland, Wm. & Harvey, Phila., Pa.  
Sabin Machine Co., Montpelier, Vt.  
Washburn & Moen Mfg. Co., Worcester, Mass.  
Wolff, R. H. & Co., Ltd., 118th St. and Harlem River, N. Y.
- Spring Hinges.**  
Bommer Bros., Brooklyn, N. Y.  
Chicago Spring Butt Co., Chicago, Ill.  
Pullman Sash Balance Co., Rochester, N. Y.  
Stover Mfg. Co., Freeport, Ill.  
Van Wagoner & Williams Hdw. Co., 14 Warren St., N. Y.
- Stamping Works.**  
Avery Stamping Co., Cleveland, O.  
Cleveland Stamping & Tool Co., Cleveland, O.
- Staples.**  
Cobb & Drew, Plymouth, Mass.  
Titchener, E.H. & Co., Binghamton, N.Y.
- Steam Gauges.**  
Bristol Co., Waterbury, Conn.  
Star Brass Mfg. Co., Boston, Mass.
- Steam Hammers, &c., Makers of.**  
Dienelt & Eisenhart, Philadelphia.  
Dudgdon, Richard, 24 Columbia Street, N. Y.  
Tretlowey Mfg. Co., Pittsburgh, Pa.
- Steam Heating & Oil Separators.**  
Webster, Warren & Co., Camden, N. J.
- Steam Separators.**  
Harrison Safety Boiler Wks., Phila., Pa.  
Webster, Warren & Co., Camden, N. J.
- Steam Specialties.**  
D'Este & Seeley Co., Boston, Mass.  
Lunkenheimer Co., Cincinnati, O.  
Newark Regulator Co., Newark, O.
- Steam Traps.**  
D'Este & Seeley Co., Boston, Mass.
- Steel, Cold Rolled Strip.**  
Superior Steel Co., Pittsburgh, Pa.  
Wilmut & Hobbs Mfg. Co., Bridgeport, Conn.
- Steel Figures and Alphabet.**  
Hoefig, C. W., 52 Fulton St., N. Y.  
Krogerud, W., 61 Fulton St., N. Y.
- Steel Importers.**  
Abbott, Wheelock & Co., N. Y. and Boston.  
Hobson, Francis, Seaman & Co., 97 John St., N. Y.  
Jessop, Wm. & Sons, Sheffield, England, or 41 John, N. Y.  
Mine, A. & Co., 1 Broadway, N. Y.  
Newton & Shipman, 83 John, N. Y.  
Wetherell Bros., 93 Liberty St., N. Y.  
Whitney, A. R. & Co., B'way, N. Y.  
Wolff, R. H. & Co., Ltd., 118th Street and Harlem River, N. Y.
- Steel (Mushet's Special).**  
Jones, B. M. & Co., Boston.
- Steel Manufacturers.**  
Aetna-Standard Iron & Steel Co., Bridgeport, O.  
Bethlehem Iron Co., S. Bethlehem, Pa.  
Baker, Hermann & Co., 103 Duane St. Carbon Steel Co., Pittsburgh, Pa.  
Chester Steel Castings Co., Phila., Pa.  
Chrome Steel Works, Brooklyn, N. Y.  
Crescent Steel Co., Pittsburgh, Pa.  
Frankford Steel Co., Philadelphia.  
Gautier Steel Department of Cambria Iron Co., Johnstown, Pa.  
Hobson, Francis, Seaman & Co., 97 John St., N. Y.  
Jessop, Wm. & Sons, Sheffield, England, or 41 John, N. Y.  
Kaiser, Ellison & Co., Sheffield, Eng.  
La Belle Steel Co., Pittsburgh, Pa.  
Lukens Iron & Steel Co., Coatesville, Pa.  
Moorehead-McCleane Co., Pittsburgh, Pa.  
Moss, F. W., 83 John, N. Y.  
Pottsville Iron and Steel Co., Pottsville, Pa.  
Bowland, Wm. & Harvey, Frankford, Philadelphia.  
Singer, Nimick & Co., Pittsburgh, Pa.  
Superior Steel Co., Pittsburgh, Pa.  
Valley Steel Co., St. Louis, Mo.  
Wardlaw, S. & C., Sheffield, Eng.  
Wetherell Bros., 93 Liberty, N. Y.  
Wilmut & Hobbs Mfg. Co., Bridgeport, Conn.
- Steel, Manufacturers' Agents.**  
Barns, C. K. & Co., Philadelphia, Pa.  
Butze, Adolph, St. Louis, Mo.  
Corning, Edw. & Co., 29 B'way, N. Y.  
Lindsay, Jas. G. & Co., Phila., Pa.  
Pierston & Co., 29 Broadway, N. Y.
- Steel Rails, Manufacturers of.**  
Bethlehem Iron Co., S. Bethlehem, Pa.  
Cambria Iron Co., Johnstown, Pa.  
Montour Iron & Steel Co., Danville, Pa.  
Riverside Iron Wks., Wheeling, W. Va.
- Steel, Tool.**  
Frankford Steel Co., Philadelphia, Pa.  
Jessop, Wm. & Sons, Sheffield, England, 41 John, N. Y.  
Jones, B. M. & Co., Boston, Mass.  
La Belle Steel Co., Pittsburgh, Pa.
- Step Ladders, Rolling.**  
Bicycle Step Ladder Co., Chicago, Ill.  
Coburn Trolley Track Mfg. Co., Holyoke, Mass.  
Croissant, M., Albany, N. Y.
- Stocks and Dies.**  
Armstrong Mfg. Co., Bridgeport, Conn.  
Billings & Spencer Co., Hartford, Conn.  
Butterfield & Co., Derby Line, Vt.  
Hart Mfg. Co., Cleveland, O.  
Oster Mfg. Co., Cleveland, O.  
Saunders' Sons, D., Yonkers, N. Y.  
Wells Bros. & Co., Greenfield, Mass.  
Wiley & Russell Mfg. Co., Greenfield, Mass.
- Stone Saws and Planers.**  
Lincoln Iron Works, Rutland, Vt.
- Store Fixtures.**  
Wernicke Co., Minneapolis, Minn.
- Stove Linings.**  
Ostrander Fire Brick Co., Troy, N. Y.
- Stove Pipe Thimbles.**  
Cheney, S. & Son, Manlius, N. Y.
- Stove Trucks.**  
Tucker & Dorsey Mfg. Co., Indianapolis, Ind.
- Street Lamps.**  
Steam Gauge & Lantern Co., Syracuse, N. Y.
- Structural Iron Work.**  
Berlin Iron Bridge Co., East Berlin, Conn.  
Lindsay, Jas. G. & Co., Phila., Pa.
- Structural Tubing.**  
National Structural Tubing Co., Potter Bldg., N. Y.
- Sulphuric Acid.**  
Mathiessen & Hegeler Zinc Co., La Salle, Ill.
- Tacks, Brads, Staples, &c.**  
Atlantic Tack Corporation, Boston, Mass.  
Chess Bros., Pittsburgh, Pa.  
Clendenin Bros., Baltimore, Md.  
Cobb & Drew, Plymouth, Mass.  
Grand Crossing Tack Co., Grand Crossing, Ill.  
Shelton Co., Birmingham, Conn.
- Tack and Nail Machinery.**  
Kimball Bros. & Co., Brockton, Mass.  
Sweetser, W. A., Brockton, Mass.
- Taps and Dies.**  
Butterfield & Co., Derby Line, Vt.  
Carpenter, J. M., Tap & Die Co., Pawtucket, R. I.  
Manning, Maxwell & Moore, 111 Liberty St., N. Y.  
Wells Bros. & Co., Greenfield, Mass.  
Wiley & Russell Mfg. Co., Greenfield, Mass.
- Testing Laboratories.**  
Riehle Bros. Testing Mach. Co., Philadelphia.
- Testing Machines.**  
Riehle Bros. Testing Mach. Co., Phila.
- Theatrical Hardware.**  
Wollensak, J. F., Chicago, Ill.
- Thill Springs.**  
Frost Thill Spring Co., Boston, Mass.  
Sabin Machine Co., Montpelier, Vt.
- Thrust Collars.**  
Gouverneur Mach. Co., Gouverneur, N. Y.
- Time Record.**  
Scattergood, H. W., Phila., Pa.
- Tin Plate Machinery.**  
Lloyd Booth Co., Youngstown, Ohio.
- Tire Upsetters.**  
Butts & Ordway, Boston, Mass.
- Toe Calks, Steel.**  
Burke, P. F., Boston, Mass.
- Tool Chests.**  
Am. Tool Co., 200 W. Houston St., N. Y.
- Tool Holders.**  
Armstrong Bros. Tool Co., Chicago, Ill.
- Tools.**  
Brown, R. H. & Co., New Haven, Conn.  
Leavitt Mh. Co., Orange, Mass.  
Mayhew, E. H. Co., Shelburne Falls, Mass.  
Millers Falls Co., 93 Reade, N. Y.  
Richardson, C. F. & Son, Athol, Mass.  
Standard Tool Co., Athol, Mass.  
Stanley Rule & Level Co., 29 Chambers Street, L. S., Athol, Mass.  
Stearns, E. C. & Co., Syracuse, N. Y.  
Stevens, J. Arms & Tool Co., Chicopee Falls, Mass.
- Tools, Blacksmith and Wheelwright.**  
Buffalo Forge Co., Buffalo, N. Y.  
Butts & Ordway, Boston, Mass.  
Champion Blower & Forge Co., Lancaster, Pa.  
Oster Mfg. Co., Cleveland, Ohio.  
Plumb, Fayette R., Philadelphia, Pa.  
Wiley & Russell Mfg. Co., Greenfield, Mass.
- Tools, Steam and Gas Fitters'.**  
Saunders' Sons, D., Yonkers, N. Y.
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Dangler Stove & Mfg. Co., Cleveland, O.  
Schneider & Trenkamp Co., Cleveland, Ohio.  
Standard Lighting Co., Cleveland, O.
- Tote Boxes.**  
Clark, W. J. & Co., Salem, O.
- Transom Litters.**  
Wollensak, J. F., Chicago, Ill.
- Tree Holders.**  
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- Trucks, Manufacturers of.**  
Clark, G. P., Windsor Locks, Conn.
- Tubes, Seamless Drawn Copper.**  
Ansania Brass & Copper Co., 19 and 21 Cliff, N. Y.  
Randolph & Clowes, Waterbury, Conn.
- Tubes, Steel.**  
Avery Stamping Co., Cleveland, O.  
Leng's, John S. Son & Co., 4 Fletcher St., New York.  
U. S. Projectile Co., Brooklyn, N. Y.
- Tubing, Structural.**  
National Structural Tubing Co., Potter Bldg., N. Y.
- Tumbling Barrels.**  
Henderson Bros., Waterbury, Conn.
- Turnbuckles.**  
Cleveland City Forge & Iron Co., Cleveland, O.  
Merrill Bros., Brooklyn, E. D.
- Twist Drills, Makers of.**  
Cleveland Twist Drill Co., Cleveland.  
Morse Twist Drill & Machine Co., New Bedford, Mass.  
New Process Twist Drill Co., Taunton, Mass.  
Standard Tool Co., Cleveland.
- Valves, Gas, Water and Steam.**  
Chapman Valve Mfg. Co., Boston.  
Eynon-Evans Mfg. Co., Philadelphia, Pa.  
Jenkins Bros., 71 John, N. Y.  
Lunkenheimer Co., Cincinnati, O.  
McNab & Harlin Mfg. Co., 66 John, N. Y.
- Ventilating Fans.**  
Perkins, B. F. & Son, Holyoke, Mass.
- Ventilator Appliances.**  
Howard & Morse, 46 Fulton St., N. Y.
- Vise Jaws.**  
Newark Mch. Tool Co., Newark, N. J.
- Vises.**  
Hollands Mfg. Co., Erie, Pa.  
Howard Iron Works, Buffalo, N. Y.  
Millers Falls Co., 93 Reade St., N. Y.  
Parker, Chas. Co., Meriden, Conn.  
Prentiss Vise Co., 44 Barclay, N. Y.
- Wagon Jacks.**  
Covert Mfg. Co., West Troy, N. Y.  
Covert's Saddlery Works, Farmer, N. Y.
- Washers.**  
Haskell, Wm. H. Co., Pawtucket, R. I.  
Milton Mfg. Co., Milton, Pa.  
Sternbergh, J. H. & Son, Reading, Pa.
- Washing Machines.**  
Richmond Cedar Wks., Richmond, Va.
- Water Meters.**  
Worthington, Henry R., 86 & 88 Liberty St., N. Y.
- Water Wheels.**  
Poole, Robt. & Son Co., Balimore, Md.
- Wheelbarrows.**  
Bryan Mfg. Co., Bryan, Ohio.  
Slaney Steel Scraper Co., Sidney, O.  
Withington & Cooley Mfg. Co., Jackson, Mich.
- Window Cord, Makers of.**  
Samson Cordage Works, Boston, Mass.
- Wire, Manufacturers of.**  
Cincinnati Barb Wire Fence Co., Cincinnati, O.  
Gautier Steel Department of Cambria Iron Co., Johnstown, Pa.  
Miller & Van Winkle, Brooklyn, N. Y.  
New Castle Wire Nail Co., New Castle, Pa.  
New Haven Wire Mfg. Co., New Haven, Conn.  
Salem Wire Nail Co., Salem, O.  
Trenton Iron Co., Trenton, N. J.  
Washburn & Moen Mfg. Co., Worcester.  
Wetherell Bros., 93 Liberty St., N. Y.  
Wolff, R. H. & Co., Ltd., 118th St. and Harlem River, N. Y.  
Wright & Colton Wire Cloth Co., Worcester, Mass.
- Wire Cloth.**  
Barnum, E. T., Detroit, Mich.  
Clinton Wire Cloth Co., Clinton, Mass.  
Darby, Edward & Sons, Philadelphia.  
Estey, W. S., 65 Fulton, N. Y.  
Gilbert & Bennett Mfg. Co., 42 Cliff.  
Howard & Morse, 46 Fulton, N. Y.  
Ludlow-Saylor Wire Co., St. Louis, Mo.  
N. J. Wire Cloth Co., Trenton, N. J.  
Scheeler & Sons, Buffalo, N. Y.  
Wickwire Bros., Cortland, N. Y.  
Wright & Colton Wire Cloth Co., Worcester, Mass.  
W. S. Tyler Wire Works Co., Cleve'd.
- Wire Cutters.**  
Higginum Hdw. Co., Higginum, Conn.  
King, J. M. & Co., Watertown, N. Y.
- Wire Dies.**  
McFarland, Wm., Trenton, N. J.  
Newton & Shipman, 83 John St., N. Y.
- Wire Fences, See Fencing, Iron and Wire.**
- Wire Goods, Manufacturers of.**  
Darby, Edward & Sons, Phila.  
Gilbert & Bennett Mfg. Co., 42 Cliff St., N. Y.  
Ludlow-Saylor Wire Co., St. Louis.  
Scheeler & Sons, Buffalo, N. Y.  
Wickwire Bros., Cortland, N. Y.  
Williamson, C. T., Wire Novelty Co., Newark, N. J.  
Wire Goods Co., Worcester, Mass.
- Wire Machinery.**  
Am. Tool Wks., Cleveland, O.  
Manville, E. J. Mch. Co., Waterbury, Ct.  
Morgan Construction Co., Worcester, Mass.  
Waterbury Mch. Co., Waterbury, Conn.
- Wire Straightening and Cutting Machinery.**  
Add, John & Son, New Haven, Conn.
- Wire Nails.**  
Bond Nail Co., Raynham, Mass.  
Indiana Wire Fence Co., Crawfordville, Ind.  
Kilmer Mfg. Co., Newburg, N. Y.  
New Castle Wire Nail Co., New Castle, Pa.  
Salem Wire Nail Co., Salem, O.  
Taunton Wire Nail Co., Taunton, Mass.  
Whitney, A. R. & Co., New York City.
- Wire Rods, Steel.**  
New Castle Wire Nail Co., New Castle, Pa.  
Washburn & Moen Mfg. Co., Worcester, Mass.  
Whitney, A. R. & Co., 17 B'way, N. Y.  
Wolff, R. H. & Co., Ltd., 118th Street and Harlem River, N. Y.
- Wire Rope, Iron and Steel, Makers.**  
Broderick & Bascom Rope Co., St. Louis, Mo.  
California Wire Works, San Francisco.  
Hazard Mfg. Co., Wilkesbarre, Pa.  
A. Leschen & Sons Rope Co., St. Louis.  
Trenton Iron Co., Trenton, N. J.  
Washburn & Moen Mfg. Co., Worcester, Mass.
- Wire Rope Machinery.**  
Kay, J. F., Passaic, N. J.
- Wood Turning.**  
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- Wood-Working Machinery.**  
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Seneca Falls Mfg. Co., Seneca Falls, N. Y.
- Wrenches, Manufacturers.**  
Bemis & Call Hardware & Tool Co., Springfield, Mass.  
Billings, Spencer & Co., Hartford, Conn.  
Coes Wrench Co., Worcester, Mass.  
Trimont Mfg. Co., Roxbury, Pa.  
Walworth Mfg. Co., Boston, Mass.
- Wringers.**  
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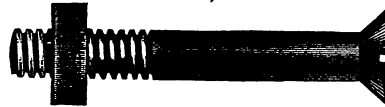
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		Covert Mfg. Co.....	76	Gibbs Mfg. Co.....	88	King, J. M. & Co.....	65

Kreischer, B. & Sons.....	26	New Haven Mfg. Co.....	38	Riverside Iron Works.....	19	Taunton Locomotive Mfg. Co.....	30
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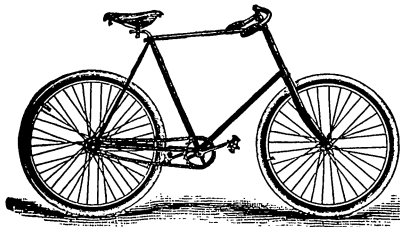
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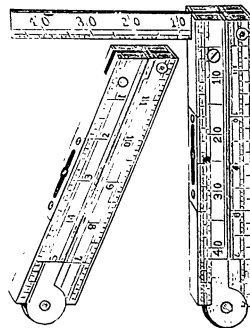
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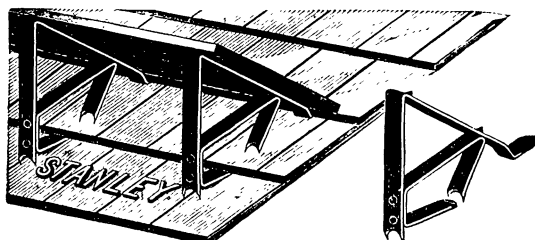
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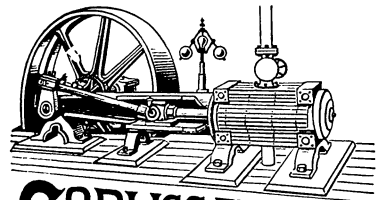
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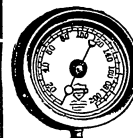
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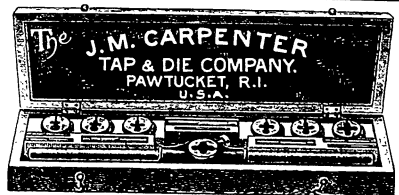
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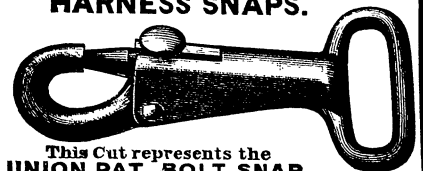
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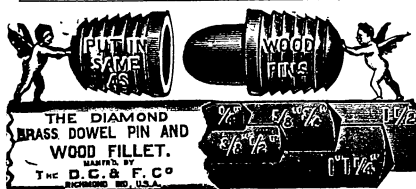
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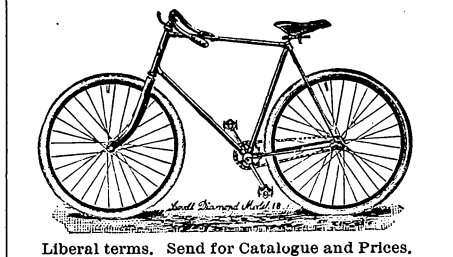
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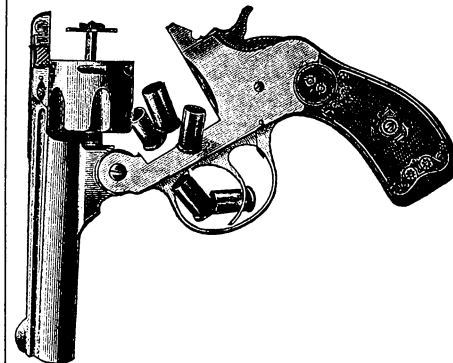
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THURSDAY, OCTOBER 11, 1894.

## The Bickley Vertical Engine.

A vertical steam engine embodying several new features has been designed and built by J. H. Bickley, Jr., of J. H. Bickley & Son, designers of rolls and rolling mill machinery, of Dover, N. J. The aim has been to combine lightness with strength in both the moving and stationary parts, and to provide easy access to all parts for adjustment or repair. The columns are of tube steel of extra thickness, and the bed is cast light and is well ribbed to withstand any severe or sudden strains to which it may be subjected.

The most novel characteristic of the engine is the parallel motion, which does away with the usual cross-head and guides. The form of this motion is clearly shown in the engraving. To the right hand columns are pivoted the ends of two links. To the end of the front link are pivoted the valve and eccentric rods, and also one end of a second link. The construction on the opposite side of the engine is similar, with the exception of the valve and eccentric rod connections. The outer end of the second link is pivoted to a lever united at one end to the lower end of the piston rod, and at the other end to a rod pivoted to the top of the frame. This arrangement keeps the piston rod in perfect line and permits the engine to run at high speed. In a compound engine of this type the levers of the parallel motion are extended and connected to the pump, thereby reducing the number of parts necessary.

Chicago has an official known as City Statistician. Officers under his direction have been engaged for over a month in making an investigation into the operations of manufacturing establishments, to see how well they are employed. He now reports that the various industries, including all the large factories, are running full time and with their full number of employees. This is highly gratifying if true, but unfortunately the Chicago newspapers are inclined to be skeptical and demand stronger evidence that times are really so much improved as the statement indicates. Political exigencies are claimed to have colored the report.

Engineer T. T. Johnston of the Chicago drainage canal, estimates that the canal, with its capacity of 10,000 cubic feet per second, will lower the level of Lake Michigan 4 or 5 inches. He regards Lake Superior as a great natural

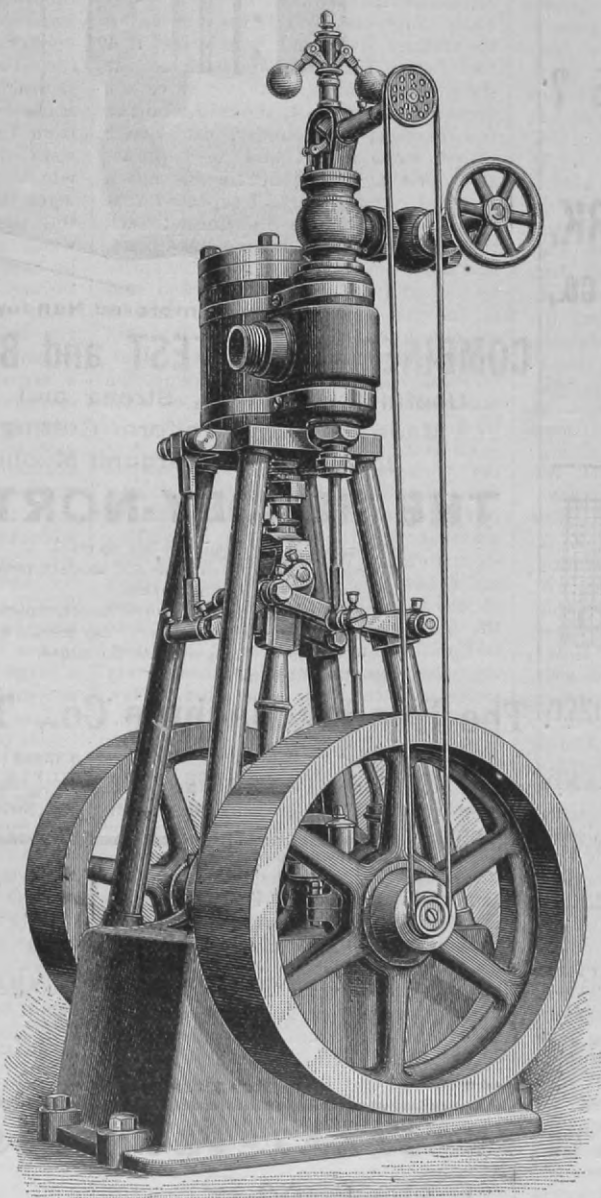
reservoir which should be regulated so as to supply the lower lakes with an even depth of water. This can easily be done, as its level is 20 feet above theirs.

After the recent Italian naval maneuvers the principal war vessels were ordered to make comparative speed

## Freight Traffic on the Great Lakes.

From the *Marine Review* of Cleveland we take the following:

The monthly report of St. Mary's Falls Canal traffic, as furnished by Mr. Wheeler, who is in direct charge of the canal under General Poe of the War Department, has come to be the barometer of lake commerce. These reports, covering only Lake Superior business, furnish the only reliable statistics of lake commerce that are to be obtained at all times during the season. As the entire freight business of the canal up to September 1 was 593,536 tons in excess of the traffic up to the same date in 1893, it is now about certain that the tonnage for the full season will exceed that of the record year, 1892, when a little more than 11,000,000 tons of freight was passed through the canal. But it is the comparative movement of soft coal and iron ore in which vessel owners are most interested at this time. During the month of August 648,042 tons of soft coal went to all Lake Superior ports, which, added to 286,785 tons, the small amount moved previous to that date, gives a total of 934,827 tons forwarded to September 1. During the full season of 1893 the shipments of soft coal to all Lake Superior ports aggregated in round numbers 2,500,000 tons. This would apparently leave a big deficiency in soft coal shipments, but it must be remembered that as a big surplus of coal was shipped to Lake Superior last season, so much so that no new coal was required until about July 1, the requirements this season will practically cover only nine months, as against 15 months last season. Shipments of ore from Lake Superior ports again show a large increase. Reduced to gross tons, the shipments through the canal during August were 393,286 tons greater than during August of 1893, and the aggregate from the opening to September 1 is 3,757,940 tons, which is 1,421,661 tons more than was shipped through the canal up to September 1, 1893. In this connection, it must be remembered that, although exact figures regarding shipments from Lake Michigan—Escanaba and Gladstone—are not obtainable, it is known that there is a decrease in the Lake Michigan movement to September 1, as compared with that date last year, of fully 800,000 tons, so that ore shipments from all points are now, in round numbers, about 600,000 tons greater than they were at this time a year ago. Shipments of flour and



NEW FORM OF VERTICAL ENGINE.

trials on the high seas, using coal and crude petroleum for fuel. The results have not yet been collated.

European technical journals report that cast iron blocks are being tried in some of the most frequented streets of Paris instead of the granite blocks usually placed alongside tramway rails. These iron blocks are 10 x 7 x 6 inches, chamfered at the edges and grooved on the faces so as to allow them to be turned when one face is worn.



lumber from Lake Superior show a remarkable gain over last year, the increase of the former amounting to 804,681 barrels and that of the latter to 109,374 000 feet.

## The Mining Engineers.

The sixty-seventh meeting of the American Institute of Mining Engineers was held at Black Rock, near Bridgeport, Conn., last week. While fairly well attended and affording good opportunities to inspect the manufacturing industries of Bridgeport and the Naugatuck Valley, the professional work in the number and character of papers read was singularly below the standard.

Among those in attendance were John Fritz of Bethlehem, Pa., president; E. G. Spillsbury of the Trenton Iron Company; J. F. Holloway and E. V. D'Inivilliers, vice-president; Dr. David T. Day, Washington; E. D. Leavitt, consulting engineer, Calumet & Hecla Mining Company, Cambridge, Mass.; B. F. Fackenthal, Jr., president Thomas Iron Company, Easton, Pa.; E. S. Cook, president Warwick Iron Company, Pottstown, Pa.; Oliver Williams, Bryden Horse Shoe Company, Catasauqua, Pa.; W. H. Jaques, ordnance engineer, New York; G. F. Knapp, Maryland Steel Company, Sparrows Point, Md.; E. W. Parker, U. S. Geological Survey; E. C. Pechin, Cleveland, O.; J. C. Platt, Waterford, Conn.; William Kent, New York; W. H. Wiley, New York; Prof. H. B. Nason, Troy, N. Y.; A. R. Ledoux, New York; F. L. Clerc, Joplin, Mo.; E. A. Olcott, New York; J. Parke Channing, A. D. Peters, Jr., Boston, Mass.; W. F. Durfee, New Brighton, S. I.; John Birkinbine, Philadelphia; E. O. Goss, Waterbury; Dr. Torrey, H. M. Howe, Boston, Mass.; W. B. Kunhardt, New York; E. A. Russell Tratman, *Engineering News*, New York; R. P. Rothwell, *Engineering and Mining Journal*; Thomas Hobson, Philadelphia, and C. Kirchhoff, *The Iron Age*; W. S. Hungerford of Ames & Co., Jersey City, N. J.; J. A. Walker, Joseph Dixon Crucible Company, Jersey City, N. J.; J. S. Lane of Lane & Bidley; T. Guilford Smith, Buffalo, N. Y.; Oberlin Smith, Ferracute Machine Company, Bridgeton, N. J.; Prof. S. M. Pitman, Philadelphia, Pa.; J. Pierce, Jr., Baltimore, Md.

The proceedings were opened on Tuesday night by a few words from Dr. J. De Ver Warner, chairman of the Local Committee, and by an address of welcome delivered by Dr. Geo. L. Porter. John Fritz of Bethlehem responded briefly, and then, as the usual presidential address, related some instances from the earlier days of his connection with the iron trade, from which we quote:

### Reminiscences of John Fritz.

My first practical experience in iron making was in 1838, while a cub apprentice in a country machine and blacksmith shop, when I was sent out to a charcoal furnace to do some repair work. The furnace was blown by water power, the motor being an undershot wheel having a wooden shaft, in the ends of which were secured cast iron winged gudgeons. One of them had a crank cast on it in which the crank pin was inserted that drove the connecting rod and piston in the wooden blowing tubes, as they were called. The dimensions of the furnace are unknown, but it made about 12 tons of

iron per week when it worked well, and when it did not work well, which was often the case, it made none. The particular job I was sent to do was to put in a new blast pipe connecting the main blast pipe with the tuyere of the furnace, and when I got it up in place to my chagrin I found it did not reach the opening in the stack by about 10 inches. The conclusion was that some one had made a big blunder, something that happened sometimes even in those days, and the supposition was that it must have been the man who made the pipe, as the workmen in those days took their own measurements. In case of a mistake they generally got what we called a "blowing up," and if the error was made by a cub he got an especially rough one. While I was thinking the matter over and wondering if I had better take the pipe back to the shop, several miles away, or move the furnace in to meet it, the man who ran the furnace, or founder, as he was called, came along, and his appearance just at this juncture was not a pleasant one for me, as I expected that when he saw that the pipe did not reach the tuyere he would give me a blast, and a hot one as well. To my surprise he looked at it for a moment and said it was just right. But while this let me out, I could not but think it ought to have reached to the tuyere. I afterward learned that the connection was made with a leather pipe called a boot.

In the neighborhood where I spent my younger days there were several mills for rolling boiler plate, and as a boy I spent much time in watching what at the time was an interesting sight to me. While there were several mills there, the one I propose to speak of was the oldest, and, as it is claimed, the first mill in the United States to roll plates to make boilers, it then having the reputation of making very superior plates, and, I am glad to say, it still sustains its early acquired fame.

### Early Plate Rolling.

In 1790 Isaac Pennock, the great grandfather of the present proprietors of the Lukens Iron & Steel Company, began the manufacture of iron at a place on Buck Run, Chester County, Pa., called Rokeby, about 4 miles south of Coatesville. Isaac Pennock was raised as a farmer in the neighborhood, and his parents strongly objected to his going into a business about which he knew nothing, as they felt he would squander his money. The mill he first built was called the Federal Slitting Mill. In 1810 he bought a saw mill property on the Brandywine near Coatesville, which he converted into an iron mill. At the time it was called the Brandywine, and has since developed into the immense plant it now is. In 1816 Dr. Charles Lukens, a son-in-law of Isaac Pennock, came into possession of the property, and carried on the business of iron making until his death in 1825. It is claimed that it was between these dates that the first boiler plates were made in this country and in this mill. At the death of Dr. Lukens, his widow, in accordance with his special request, continued to carry on the business, although handicapped by the fact that there were no railroads in those days. The finished iron had to be teamed to Philadelphia, a distance of 36 miles, or to Wilmington, Del., 26 miles, while the coal used was hauled from Columbia, about 35 miles away; yet, in spite of these difficulties, she carried on the iron making business, hiring a superintendent to look after the works and

the workmen, while she herself managed the business of the office. Mrs. Lukens was considered an extraordinary business woman, and she built up a business which has been continuously successful up to the present, and which has remained in the same family for four generations. It was in honor of her extraordinary abilities that the name of the works was changed from Brandywine to Lukens.

Originally the sheets were made from a single charcoal bloom, the bloom having been made in the old fashioned forge fire, then reheated over an ordinary grate fire and rolled into plates or sheets. The sheets were shipped without being sheared, the shearings in those days being cut into nails. Afterward they put up a reverberatory heating furnace in which they worked up the scrap themselves. The plate rolls, as near as can be now ascertained, were about 16 to 18 inches in diameter, and from 3 to 4 feet long in the body, and were driven by an undershot water wheel. It is said that many a time when it looked as if the mill would stall the workmen would rush for the water wheel, climb up on its rim and by their united weight help the pass through the rolls, thus preventing a stall, which meant fire cracked rolls and later on broken ones. This water wheel was afterward supplemented by a breast wheel, so geared as to give more power to the rolls. This enabled them to use larger rolls, but the gearing gave so much trouble that they finally abandoned the use of the water wheel and put in a steam engine and enlarged their rolls to 21 inches in diameter and 66 inches between the journals. This was again changed to 25 inches diameter and 84-inch long chilled rolls. After several other changes they at last put in three-high chilled rolls 34 inches in diameter by 120 inches long, a large Corliss engine to drive them, automatic lifting tables, &c.

The weight and size of the early boiler plates as made on the oldest mill I have been unable to get, but it is not supposed that they attempted anything weighing over 500 pounds, and probably 300 pounds was nearer their limit. As an illustration of the changes that have taken place in this one mill, it may be noted that as now enlarged they readily roll plates 119 inches wide and 50 to 60 feet long. The little old mill on which the workmen had to climb on the wheel to help make it go round is one of the best plate mills in the country. Its owners and managers are the great-grandchildren of Isaac Pennock, who in 1790 built the Federal Slitting Mill on Buck Run, and in 1810, on the banks of the Brandywine, what was called the Brandywine Mill.

### Early Bar Making.

In the year 1845 I went to Norristown, Pa., and assisted in the building of what at that time was considered the best mill for making bar iron in this country; in fact it was called a model mill, and in many respects it was. While it was a geared mill, it was so much better built than any other mill of the kind that it was expected that it would give little or no trouble on that score, but we were sadly disappointed, for, soon after starting, the gears began to give away, the back lash and the jar of the rolls causing the teeth to break and drop out. I was given charge of the machinery, and of course had to look after the gear wheels. At times the entire wheels seemed to go to pieces at once, at other times the arms cracked, and then again

the teeth broke, each break, of course, stopping the entire mill. Then all hands had to work day and night to get started again. At first we had to go to the foundry to get such parts as had been broken made over. This, of course, caused considerable delay, and, to avoid this loss of time, we began to keep segments of gearing on hand, and we had separate wrought iron teeth made ready for insertion, and we kept clamps ready to strengthen broken arms. With such extended experience I became quite expert in inserting teeth, and it was no doubt due to this fact that, on the occasion of several hundred of my friends coming to Bethlehem not long ago, I was arrested at the banquet and tried on the charge of practicing dentistry without first having procured a license or diploma.

Soon after the mill started I was placed in charge of it on the night turn, including the puddling furnaces and the few heating furnaces used for rolling covers. While this added somewhat to my duties, it proved of great advantage to me, as it gave me an opportunity to obtain a practical knowledge of iron making. Later on, I was given charge of the mill on the day turn, which practically meant both day and night, as it was during the day that everything had to be arranged for the night work, and that, too, before a supper could be eaten or a rest obtained, and often not then. In a short time I was given, in addition to my other duties, that of having charge of the roll turning and to see that the iron they rolled was properly finished. In short, I, who had entered the mill as a machinist, was now in charge as an iron master, and it was in connection with this new departure that my troubles began.

In those early days the chemistry of iron making was unknown, at least in this country, and iron makers were often but the blind leading the blind. At the present time, if there is any trouble with the product of an iron or steel mill the chemist is sent for, and he is expected to carefully analyze the ore, fuel, flux, cinder and even the furnace linings, and find and eliminate the troublesome element, be what it may, that is damaging the product. But in the early days of iron making we had no such help and had to feel our way the best we could.

The process of making bar iron by the use of the charcoal forge had become too expensive for iron to be used for ordinary purposes, and the art of making bar iron through the puddling process was the only other means of any promise to which we could turn for relief, and that process was at that time what was called the fermenting process, in which white iron only could be used. We soon learned that only a few brands of pig iron could thus be worked into merchantable bar iron, as, by reason of being cold short, it often proved worthless. The worst of it was we did not know what caused it. As the works were built to make high grade bar iron, which must be neutral, we were in a great quandary, not knowing which way to turn; but as the only way out was to keep on experimenting, we did so, sometimes finding a pig metal that gave good results. Then all at once it would go wrong again. Why, we could not tell; but it was always in order to lay it on the poor puddler, and to give him a good "blowing up."

At times we found that by mixing several brands of charcoal pig we would get good results, but as the price of bar iron was low we could not afford to use

high priced pig. So we began to experiment with anthracite iron and with it the old-time troubles, or even worse, returned as we got both cold and red short iron. At this time one of the blast furnaces which had been making charcoal iron began to use anthracite coal for fuel. In our distress we tried some of their pigs and got quite good results, the bars not being cold short, but quite inclined to red shortness, and for many purposes, such as shafting, car axles, heavy bolts, &c., it proved very suitable. But for the use of the blacksmith it was quite unfit, as they then knew nothing about working red short iron, and of course they condemned it.

We had now learned that good fibrous iron could be made from anthracite pig metal, but for the highest grades of bar iron we were still compelled to use charcoal pig and in the old way. It would occupy too much of your time to relate in detail the long series of experiments, often ending in disaster, we went through, never knowing when the iron would be good or what it was that made it bad until at last by accident we stumbled on the cause of the trouble.

We noticed that after making red short iron for a time and a change was made to neutral iron, the iron was still inclined to red shortness. In a day or two the red shortness would die out and we would get on to good bar iron. It gradually dawned on us that the trouble might come from the cinder that was left in the furnace when red short iron was being made, so when we next changed over from red short to neutral iron we cleaned all the cinder out of the furnace with great care and refired it with neutral cinder. To our great joy we found that the secret of our troubles had been discovered and that we could now make neutral or red short iron as we wanted to, with a tolerable degree of certainty.

While the experiences and trouble gone through were both perplexing and annoying they proved of great value to me in after years, and especially when we began to make steel by the Bessemer process, for I had early learned how a very small percentage of an objectionable element, either in the ore, the metal or fuel, would greatly damage the product. In addition to the trouble we were having in making the iron we were constantly breaking gearing, spindles, or rolls and couplings. In order to reduce the cost of repairs as much as possible we tried to have some part of the train made strong enough to do the work when everything was going right, and weak enough to break when anything was going wrong. This was, of course, a cut and try business. Sometimes the part we intended to break was made of extra strong iron and then it failed to break and some other part would give way; then we reduced the pattern and made it lighter, and the next casting made of that pattern might happen to be weak iron, and it broke too easily, and then we would have to strengthen the pattern again. So from day to day we went on with one break after another, varied occasionally by the giving way of a coupling box, spindle, or breaking box, if the latter would let the end of the roll raise up in the housings, and if the roll was a collared one, off would go the collar and the roll would be ruined. Of course, the breaking of teeth in the gear wheels was a common occurrence, and so much trouble came from this source that I remember that, over 45 years ago, I was almost inclined to register a vow that I would never again have anything to do

with a piece of machinery that had a cog wheel in it.

Before closing this chapter in the history of iron making, and before bidding adieu to the puddler, who, with his rabbling iron, is now rapidly passing out of sight, I want to say of him that for over half a century he and I have been working together in doing what we could in advancing the art of iron making in this country. The old time puddler was usually a foreigner, and almost always a Welshman. I have in the past employed large numbers of them, and generally found them intelligent and faithful workers, often hampered by the notions and prejudices they brought with them from the iron mills of their native land, but generally when shown a good reason for any change of practice willing to adopt it in the end. As I see the puddling furnace grown cold, its damper down, its bosh dry and its brick work crumbling to decay, and the master workman, with his coat hung on his arm, his dinner pail in his hand, leaving the mill and his trade to be usurped by other and newer processes, I am saddened by the thought that perhaps in the midst of the perplexities and troubles we have both gone through years ago I was not quite as patient with him as I ought to have been, and I am certain that the world at large does not fully realize how much of its growth and prosperity is due to the hard working, perspiring puddler of long ago.

#### The First Three-High Mill.

In the year 1854 David Reeves, together with a few of his friends, leased a works for making iron rails, located at Johnstown, Pa. I was sent there to complete the mill and to superintend its working. As it was at this place where afterward great and important changes in the manufacture of rails were introduced, I have thought that a brief history of the works would be of some interest to the members of the society. The works were originally commenced by an organization called the Cambria Iron Company, but after the mill was partially built their money gave out and the project was considered a failure. It was at this time that David Reeves, Matthew Newkirk, Geo. Trotter and a few others joined together and leased the plant as it stood. Mr. Reeves, Mr. Trotter and Mr. Newkirk being the most prominent in the matter, and Mr. Newkirk acting as the business manager. Mr. Newkirk then gave me instructions to go to work at once and complete the mill as soon as possible. Having previously examined the works with great care, I can assure you that it was with serious misgivings that I undertook the task. There was a vast amount of new work to be supplied, and I had very serious doubts as to the efficiency of what had previously been done. From what I learned as to the kind of pig iron that was to be used, the outlook was anything but encouraging, and I came to the conclusion that there was serious trouble in store for me when the mill would be ready to start, and I can now testify that my forebodings were fully verified later on.

When we at last got to work and rolled a few rails the edges of their flanges looked like saw teeth, and the head was rough and full of small holes. Everybody about the mill, from the owners to the water boy, was disgusted and sick, and this was especially true of the heaters and the men about the rolls, for they were paid by the ton of finished rails. It was the general

conclusion that something would have to be done, and right quickly, too. There were three charcoal blast furnaces that belonged to the company, one of which happened to be in blast at the time, so we got some charcoal pig and puddled it and rolled it into covers for the bottoms of the rails, the common iron being above them. These piles were rolled so as to put the charcoal iron on the edges of the flanges. This worked pretty well as far as the flanges went, but it did not cure the trouble with the heads, so we had to roll other covers for the tops of the piles to make the head of the rail good, and with hot and cold patching and a liberal use of putty we managed to get some rails that passed muster. By continually experimenting in the piling of the iron and changing mixtures we finally got out some fairly good rails, but the engine and fly wheel driving the train were of such a construction that it was not safe to run it over 50 revolutions per minute, which was too slow to make rails out of the materials we were using.

One of our most serious troubles was that the forward end of the pile would split open in the rolls, so that when we came to enter it in the next pass it refused to go in and much time was lost in bunting it in the buggy, consequently cooling the pile to such an extent as that when the rolls did get hold of it, spindles, coupling boxes and sometimes the rolls themselves would break, causing both expense and delay. This, in connection with the general depression in business, brought about troubles that brought the enterprise to an end.

Again a new company was formed, and it was known as Wood, Morrell & Co. It was in part made up by David Reeves, Charles Wood, Matthew Newkirk, George Trotter, D. J. Morrell, John Shoenberger and E. Y. Townsend. Charles Wood was made president, E. Y. Townsend vice-president, and D. J. Morrell general manager. The change in the organization of the company did not, however, change the troubles in the manufacture of the rails nor increase the output, both exceedingly important matters, which, unless they could be greatly improved, would still leave the handwriting of failure on the wall. Having, in view of the past and remembering my former doubts, gone over the entire subject again, I made up my mind as to what must be done to make a success, and I was prepared to submit both my plans and recommendations to the new company.

My plan was to build an entirely new train of rolls and to make them three-high and 20 inches in diameter. This involved a new engine with a fly wheel that could be run at 100 revolutions, should it be desirable to do so, and in fact it practically meant an entirely new rail mill. When the plan was submitted to the company they said at once it could not be done for the reason that the expense would be too great. Besides the mill was an entirely new mill, which was supposed to be the very best in the country, and they did not see why it could not be made to do good work. Finally I succeeded in convincing some of the managers that something must be done, and that if they would adopt my recommendations I was certain it would be a success. After consulting together they directed me to go on and build an 18-inch two-high geared train to take the place of the train we had. To this I replied in the most emphatic manner that I would not do it, as it would be money thrown away. To my refusal they said the

position taken was a most arbitrary one, and one I had no right to take, as I was in their employ on a salary to manage their works, and that they had some right to say what should be done. To this I assented partially, but at the same time told them that if they continued in the line they were in there would in a short time be held a large funeral, and I did not intend to stay and attend it. At this the meeting adjourned. In a few days they gave me permission to go on and build such a mill as I wanted, but they thought it would be better to make the rolls 18 inches instead of 20 inches in diameter, and, by way of compromise, I consented, which was a mistake. I began to build the new train and make other important changes about the mill.

About the time we had the patterns for the new train and engine completed we were brought to a stop by a protest in the form of a legal document, holding the managing partners personally responsible for the building of a new mill. This, of course, was an unexpected stunner and all work was suspended. One Sunday morning when, as I now realize, I ought to have been at church, Mr. Townsend came down to the mill where I was alone and brought with him the legal protest and read it to me. After all these years no person other than myself can fully appreciate the trying position the managers were in. On the one hand I was urging them to go on and build a mill on an untried plan, and absolutely refusing to build the two-high geared mill they asked for, feeling that such a mill would only in a small way mitigate the troubles we had gone through, and that the money spent on such a plant would be thrown away. On the other hand there was a strong party of stockholders protesting in the most positive manner against going on with my plans, and notifying the managers that they would hold them personally liable for all the loss and damage that might grow out of their unwise action of adopting a new and untried method that was against all practice in this and the old country, from which at that time we obtained our most experienced iron makers. Besides, prominent iron makers in various parts of the country had said to Mr. Morrell that the whole business would end in a failure, and that "that man Fritz" would ruin them. The heaters and rollers were also opposed to my plans, and they appointed a committee to wait on the managers and to say to them that the three-high train would never work; that they themselves would suffer by reason of its adoption, but that if the managers would put in a two-high geared train, which was the proper thing to do, the mill would go all right.

Consent having finally been given to proceed with the erection of the new mill, as designed by me, the work was now pushed on as fast as possible, and in the construction of the rail train I made a radical departure from the old practice, which was to provide breaking pieces here and there. I tried to make everything so strong that nothing would break. One of the previous methods was to make coupling boxes and spindles so that they would break when any extra strain would come on them. The leading spindle had a groove cut round it so that it would be sure to break before the rolls. The result was the constant breaking of some of these safety devices. In addition to all these devices there was what was called a breaking box on top of the rolls which

held the roll in position. It was made hollow, so it would crush if the strain was too great. I directed the pattern maker to make it solid. The head roller seeing that the pattern was solid went to the pattern maker to have it changed and made hollow, as he supposed it had been made so by mistake, but the pattern maker refused to alter it, as he said the "old man," as they called me 40 years ago, had ordered it to be made that way. "Well," said the roller, "the old man has gone crazy and if that box is put in as it is the mill will be smashed to pieces, and I am going to see him about it," which he did. Of course, I told him the box was going in solid, as I would rather have one grand smash-up once in a while than be constantly annoyed by the breaking of spindles, couplings and breaking boxes, to which he replied, "Well, you'll get it."

The new mill having been prepared and ready to put in place, the old mill was stopped on the evening of July 3, 1857, and after the 4th I commenced to tear the old mill out, and put the new one in, and also to put in the new engine, while at the same time I remodeled everything about the rail department, and raised the floor line 2 feet. On the 29th of the same month everything was completed and the mill was ready to be started. I need not tell you that it was an extremely anxious time for me, nor need I add that no engraved cards of invitation were sent out, that not being the custom in the early days of iron making. Indeed, if it had been, it would not have been observed on that occasion. As the heaters to a man were opposed to the new kind of a mill we did not want them about at the start. We, however, secured one out of the lot, who was the most reasonable one among them, to heat the piles for us, and we kept the furnace smoking for several days as a blind. At last, everything being ready, we charged six piles. About ten o'clock in the morning the first pile was drawn and went through the rolls without the least hitch, making a perfect rail. You can judge what my feelings were as I looked upon that perfect and first rail ever made on a three-high mill, and you may in part know how grateful I felt toward the few faithful men who were about me and who had stood by me during all my trials and difficulties. Among them were Alexander Hamilton, the superintendent of the mill, and Thomas Lapsly, who had charge of the rail department; William Canam and my brother George. We now proceeded to roll the other five piles, and when two more perfect rails were rolled we were obliged to stop the engine for the reason that we were so intently watching the rolls that the engine had been neglected. Being new, the eccentric strap for want of oil got hot and bent the eccentric rod so much that the engine could no longer be worked. As it would have taken some time to straighten the rod and reset the valves the remaining piles were hauled out from the furnace on the mill floor. About this time the heaters, hearing the exhaust of the engine, came into the mill in a body and from the end opposite to where the rails were. Seeing the unrolled piles lying on the floor they took it for granted that the new train was a failure and their remarks about it were far from being complimentary. Mr. Hamilton, coming along about that time and hearing what they were saying about the mill, turned around, and, using language more pointed than polite, told them that if they would go

down to the other end of the mill they would see three handsomer rails than had ever been made in their country. The next day, which was Friday, we ran all day, and at night put on the regular night turn. Everything worked well up to noon of Saturday, it being our custom to stop rolling at that time. About 6 o'clock in the evening Mr. Hamilton and myself left the mill and on our way home we congratulated each other on the fact that our long line of troubles and disappointments was now over. About an hour later I heard the fire alarm whistle blow and rushing back to the mill found it one mass of flame from one end to the other. In less than one hour's time the whole building was burned to the ground. A story started that the new machinery was a total failure and that we had burned the mill to hide our blundering mistakes.

The situation of affairs on that Saturday night was such as might appall the stoutest heart. The result of our labors and anxieties lay there, a mass of black and smoking ruins, and the money that had been so hard to get with which to build the new works was gone. The prospect was gloomy, but there was one gleam of light amid all the darkness, and that was the pile of new and perfect rails, which, as Hamilton had said, had never been beaten by Wales, from which country most of the iron rails used here came. Above all, the mill had been tried and found to work magnificently. It was these two facts that gave us all fresh courage and which enabled us to rebuild the mill.

On Monday morning we commenced to clear up the wreck and to begin the work of rebuilding. In four weeks from that time the mill was running and made 30,000 tons of rails without a hitch or a break of any kind. It made the Cambria Iron Company a great financial success by giving them a rail mill far in advance of any mill in the United States. That position they held unquestionably until the revolutionary invention of Sir Henry Bessemer came into general use, and steel rails pushed to the wall the rails previously made of iron. I do not now intend to speak of the wonderful change this invention of Sir Henry Bessemer brought about in this country nor of the enormous increase in the production of rails it made possible. It is but just to say that some credit for this great increase is fairly due to the introduction of the three high roll train first erected amidst the most discouraging conditions in the mill of the Cambria Iron Company, at Johnstown, years ago.

The use and advantages pertaining to the three high train were by no means confined to the making of iron or steel rails. Let any practical man go into the iron or steel mills of this country and he will not only see how they have served to increase production, but will also see how in many ways their use had necessitated other improvements, all of which has brought about more perfect work.

If the knowledge we, in the early days, had of making bar iron and rails was incomplete and crude, it was not more so than the knowledge displayed in making pig iron. About 1838 or 1839, Mr. Kunzi, at that time a member of the firm of Farr & Kunzi, large manufacturing chemists in Philadelphia, and one of the ablest chemists of the time, made some experiments with a view to smelting iron with anthracite coal, and about 1842 or 1843 he built a blast furnace on the Schuylkill River, at Spring Mill, and after several unsuccessful attempts to make iron in it he sent

for Benjamin Perry, a practical furnace man, to come and take charge of his new furnace, which he did, and succeeded in getting it in good working shape and making fairly good iron. Mr. Kunzi was thereupon congratulating Mr. Perry on his success, and said that while he himself knew all about the chemistry of iron he knew nothing about the making of it. To this Mr. Perry replied that he knew nothing about chemistry, but he did know how to make iron. Shortly afterward Mr. Perry thought he could do better by going elsewhere and in blowing in other anthracite furnaces, and asked Mr. Kunzi to let him off. This Mr. Kunzi did not wish to do, and he invited Mr. Perry to come up to his house, with a view of trying to induce him to remain. In connection with this quite an amusing story is told. During the interview Mr. Kunzi talked about the chemistry of iron making and of the combustion of coal, &c., and consequently had a good deal to say about oxygen and hydrogen, all of which became rather tiresome to Mr. Perry, who supposed that he had been invited there to have a drink. He said to Mr. Kunzi, "I don't know a d—d thing about hydrogen or oxygen, but if you have some good Holland gin I'll take some of that."

Some 15 years ago it was my fortune to have the same founder in charge of the blast furnaces at Cambria, as even at that time he was looked upon as being the most practical blast furnace man in the country. While he was with me my friend, John Griffin of Piquetteville, paid me a visit and he wanted me to meet Mr. Perry. So I had him come up to my house where they soon got to talking on blast furnace practice, and among other things Mr. Griffin asked him about the coal they were using for making coke, to which he replied that it was bad, being full of brass. Mr. Griffin said, "Mr. Perry, you mean iron pyrites." "Well," said Perry, "you may call it what you d—d please, but I tell you it's brass," and the manner in which he spoke was so emphatic that Mr. Griffin wisely concluded not to pursue any further that branch of the subject. Yet the speaker was the best practical furnace man that I knew at that time.

At the close of the address, Edmund Pechin of Cleveland gave some data concerning early iron making which he had learned from the manager of the Fairchance Furnace, at Dunbar, Pa. In the early days of that gentleman's career as an iron master it had happened that he had only seen \$10 in money during 18 months' active business. The iron was made into bars and rods, hauled 15 miles to the Monongahela and floated down the Ohio River. In Ohio the iron was traded for whisky and corn, which was carried down the Mississippi to New Orleans. There it was exchanged for sugar and molasses, which was carried by sail to Baltimore. Cotton goods and other supplies were traded for the cargo and these were hauled over the Alleghany Mountains to Western Pennsylvania.

Dr. Raymond, the secretary, spoke a few words of tribute to the memory of the late J. H. Bramwell, concerning whose career Edmund Pechin related a number of incidents showing his wonderful pluck and courage.

The session on Wednesday morning was opened with the election of a considerable number of new members and associates. Dr. Raymond then exhibited specimens of monosite sand, a mineral containing a number of the rarer

metals, chief among them being cerium. Dr. Day reported that the principal use for the oxide of cerium now is to add it to the material of which the Welsbach light is made so as to take from it the yellow cast which it would otherwise have.

The first paper of the session was by A. R. Ledoux of New York on "A Uniform Method for the Assay of Copper Material for Gold and Silver." Dr. Ledoux called attention to the wide variations in the results obtained in the assaying of copper matte and copper bars containing the precious metals, and suggested a special inquiry with the object of arriving at some standard method to be adopted by American chemists. He proposes through the secretary of the society to furnish chemists interested in the subject with samples of material for investigation. The results, accompanied by a statement of the method employed, are to be forwarded confidentially to the secretary, and are to be published and compared without revealing the identity of the analyst. It is believed that in this manner a comparison will be possible between the different methods employed so far as their accuracy is concerned. A number of chemists, representing large smelting works, have already signified their intention to co-operate, and it is believed that the scheme can be successfully carried through. Quite an animated discussion followed, in which the necessity for careful sampling was alluded to and various points affecting the results were brought out. Thus, there was some reference to the necessary corrections for slag losses and cupel absorption, to the losses in parting in decantation, and to those due to cupelling at too high a temperature. Dr. Ledoux in alluding to the sampling of copper bars dwelt on the fact that dipped samples generally ran too high, since the material is dipped cleaner than the general average. Dr. Torrey, in reply to a suggestion thrown out by Dr. Peters, stated that Charles Taylor of the New York Assay Office has invented and is using a pyrometer for automatically controlling the temperature of the cupelling muffle. It is set once a day and automatically cuts off the supply of gas for heating the furnace when the temperature rises above that provided for by the regulation. The session closed with a review by Dr. Raymond of the recent work on an extraordinary colliery explosion in which no firedamp was known to exist and which was attributed to the destructive distillations of the hydrocarbons in the coal dust.

Dr. R. W. Raymond opened the afternoon session with a paper on "The New Mining Law in New York," dealing specially with two chapters, 317 and 745, passed during the current year. The State of New York claims by right a sovereignty over gold and silver mines on public or private lands and all the mines of other metals on alien lands. The new law gives to any citizen discovering a mine on State land the sole benefit for 21 years for a royalty of 2 per cent. on the value of the product. Under the new law any citizen may go on public or private land, provided that before breaking the surface he deposit with the secretary of the treasury of the county security for any damages inflicted. The law provides for no requirements as to working and is believed to have practically put the mining lands in the control of speculators. It is supposed that it was passed in the interest of a platinum company on Lake George.



The discussion of the paper "Does the Vibration of Stamp Stems Change Their Molecular Structure?" then followed, Dr. Raymond summarizing the principal points of his rejoinder to Philip Argall of Denver. Practically, the talk ranged over the whole subject of the crystallization of iron in service, there being strong partisans on both sides of the question. Among those who took part in the discussion were E. A. Olcott and John Wilkes of Charlotte, N. C., who referred to the fact that stamp stems break suddenly in service with a crystalline fracture. Dr. Ledoux related an experience in which the break of a main shaft of a marine engine caused the destruction of a cargo of fruit, and involved the question who was liable for the losses. In the course of the suit Mr. Ledoux prepared a specimen in which a long fibrous fracture was produced at one end. The other end of the specimen was covered. The experts on the other side declared the material to be of high grade on the strength of the one fracture, and then were met by revealing a strongly crystalline fracture produced at the other. W. F. Durfee of West New Brighton, Staten Island, explained the structure of wrought iron with special reference to the function of cinder in holding together the elongated crystals of the materials. He held that the disintegration of this film of cinder under bending stresses has an important effect upon the character of the fracture.

W. R. Webster of the Pottstown Iron Company related the experience made with a series of bridge eye bars which were condemned as being of poor material. They were thoroughly tested, when it was found that the material of the body of the bar was excellent, but that they broke in the neck. This was due to defective heat treatment. If they had broken in service they would probably have been pronounced an excellent illustration of the crystallization due to shocks in service, when, as a matter of fact, their defective heat treatment was the true cause.

In the evening the Institute was tendered a brilliant reception by the Seaside Club of Bridgeport.

Thursday was set aside for a trip to the Naugatuck Valley. A special train conveyed the party first to Ansonia, where an hour was spent in visiting the works of the Ansonia Brass & Copper Company of Phelps, Dodge & Co., under the guidance of William H. Matthews, Russel A. Cowles and Frank E. Hoadley. The visitors were taken to see the rolling of sheet copper in the new mill, and inspected also the wire rod train in the same building. They saw the large rod drawing plant of the works, and subsequently visited the brass rolling mills of the same establishment. Again taking the train the party was conveyed to Waterbury, where the local Reception Committee invited the party to partake of a luncheon served at the armory. They were welcomed by the Hon. E. C. Lewis, chairman of the Waterbury Reception Committee and president of the Waterbury Farrel Foundry & Machine Company. Dividing into parties, the members visited the works of Benedict & Burnham, Holmes, Booth & Haydens, Randolph & Clowes, Waterbury Brass Company, the Waterbury Watch Company, Scovill Mfg. Company and the Farrel Foundry. Special interest was attached to the visit to Benedict & Burnham, because that firm are now completing a plant for the manufacture of seamless tubing by the Mannes-

mann process. Some of the party were allowed to inspect this part of the works; others went through the recently remodeled rolling mill of the company, in which 13 trains of rolls, driven by a splendid example of the modern Corliss engine, are employed for rolling sheet brass and German silver, the latter being a very important part of the business of the company. Two additional trains will be put in this mill at an early date. Special interest also attached to the annealing furnaces, which, in this plant, are heated by oil. The old practice of the valley has been to employ exclusively cord wood. The introduction of oil has made it possible to largely increase the quantity put through the furnace and has very considerably improved the quality of the product. Benedict & Burnham have developed the system with much success and have a very elaborate oil distributing plant. The visitors inspected also the seamless and brazed tubing plant and the wire drawing machinery of the concern. We understand that the system of continuous wire drawing has been successful and that further machinery of this character is to be put in. The works of the Waterbury Brass Company were inspected by another large group of the visitors, since it is regarded in the valley as the model plant. At the works of Randolph & Clowes the latest additions, which enable exceptionally large seamless tubes to be drawn, were the object of special attention. At the Farrel Foundry they found work under way for local brass rolling mills and also a press for the Scovill Mfg. Company, who have secured the contract for making all the World's Fair medals. The majority of the visiting ladies made an inspection of the famous works of the Waterbury Watch Company.

Returning to Bridgeport the meeting again took up its work in the evening, the only paper read being that by Prof. J. F. Kemp of Columbia College, on the "Nickel Mines at Lancaster Gap, Pa."

On Friday morning the party took an extended trip through the city of Bridgeport and its surroundings on the cars of the Bridgeport Traction Company, under the guidance of Col. N. H. Hef, the president of the company. Finally the party landed at the works of the Bridgeport Brass Company, and then passed to the adjoining works of the Wheeler & Wilson Sewing Machine Company. There an object of special interest was a horseshoe nail machine, developed by William F. Durfee, one of the party. The original idea of cutting up the stock for making horseshoe nails with a minimum of waste was that of Fowler, who interested the Wheeler & Wilson Sewing Machine Company in his invention. Subsequently Mr. Durfee was called in to develop the machine, and he practically became its creator. The machine has a capacity of making 120 horseshoe nails a minute, and was particularly interesting to those who inspected it, from the fact that it possesses electrical arrangements which stop the machine when anything in connection with the many movements goes wrong. The company a number of years ago decided against extending their business by introducing a new line of work, so that the machine is the only one in existence and is not in regular operation, those owning it being desirous of disposing of their interest in it.

The next establishment visited was that of the Holmes & Edwards Silver Company, where the party were particularly interested in the special method

of manufacturing plated ware used by this establishment. Unlike all others the Holmes & Edwards Silver Company solder a piece of sterling silver to the back of the bowl and the handle of spoons, where the wear is naturally greatest, thus making what is usually the part of shortest life particularly well adapted for long usage. An interesting display of the wide range of goods made by these works was also made. The very handsome badge used by the party was made from dies at the works of Holmes & Edwards, the material, aluminum bronze, being furnished by the Waldo Foundry. Under the control of the same parties is the Bridgeport Chain Company, the ingenious machines which make from steel wire automatically the Triumph chain as a substitute for welded chain. It was this chain which has shown such excellent results under tests made by Professor H. S. Hele-Shaw in England, to which reference has been made in the columns of *The Iron Age*.

The party then drove to the Seaside Institute, an admirable institution in a handsome building erected by Warner Brothers for the use of the women employees of their adjoining corset factory. Here luncheon was served, after which the works of Warner Brothers were inspected. An excursion around the harbor and sound took place in the afternoon. The day was wound up with a shore dinner at the George Hotel, tendered to the institute by the Local Committee. The whole of Saturday was given to a visit to New Haven, where the party was received by the Mayor, H. B. Sargeant of Sargeant & Co. After a visit to the buildings of Yale College a drive had been arranged to East Rock, after which the members returned to their respective homes.

Although supported by a very large number of prominent citizens of Bridgeport, Waterbury, New Haven and Ansonia, it is only just to state that the arrangements and the great mass of detail work for the meeting were carried through by Dr. Leonard Waldo, the well known specialist in the manufacture of aluminum bronzes.

Three hundred tons of Harveyized side armor for the battle ship "Texas" were accepted from the Bethlehem Iron Company last week, after a Government test at the company's proving grounds. Two shots from an 8 inch gun were fired and the test plate was not cracked, while the projectiles were broken into fragments. The highest velocity of the shot was 2004 feet a second. The rest of the armor of the "Texas" has been delivered and is already in position. It is expected that the vessel will be ready for her trial trip early in 1895.

The Exchange Telegraph Company says, according to a London cable dispatch of October 8, that the Welsh tin plate manufacturers are so anxious for the return home of the British tin plate workers who came to the United States that they have offered them free transportation, in addition to guaranteeing them employment, if they will return.

Judge Advocate General Lemly of the navy has been dispatched to New Orleans to purchase the necessary land for the establishment of the Gulf Navy Yard at Algiers, La. A plot of about 25 acres, with 500 feet frontage on the Mississippi River, has been in the possession of the Navy Department



since 1848, but it has been put to no practical use. Some years ago the property was decided on as the best site for a naval station for the building and repairing of war ships, and condemnation proceeding were instituted with the view of purchasing sufficient adjoining land, on which the courts have put the price of \$44,750. This purchase is now to be completed with money appropriated by Congress last session for the purpose. Secretary Herbert proposes introducing another appropriation bill next year for funds wherewith to build a dry dock and begin the erection of buildings. The enlarged site will have a river frontage of 1325 feet and will extend back 3540 feet from the levee.

The Sewanee Furnace Record.

The Sewanee Furnace Company of the Tennessee Coal, Iron & Railroad Company, at Cowan, Tenn., has been doing some exceptional work. We are indebted to Rogers, Brown & Co. of Cincinnati for the following record for six months ending August 31:

Record of Sewanee Furnace, Cowan, Tenn., for Six Months, Ending August 31, 1894.

1894.	Prod-uct.	Days in blast.	Average make per day.	Grade foundry, per cent.	Ore yield, per cent.	Limestone used per ton iron.	Yield of total burden.	Coke used per ton iron.
March.....	3,656	27	135.4	92.2	50	0.67	37.7	1.20
April.....	4,238	29	146	90	50	0.61	38.4	1.20
May.....	4,491	31	145	97.8	47.5	0.65	36.2	1.18
June.....	4,264	29	147	59.3	50.4	0.644	38	1.21
July.....	3,595	26	138.7	80	51.6	0.75	37.2	1.29
August.....	4,564	31	147.2	89	50.2	0.64	38	1.25
Total prod-uct.....	24,408	173	.....	.....	.....	.....	.....	.....
Averages for six months.....	.....	.....	143.4	83.5	50	0.67	37.4	1.218

This is, therefore, an average fuel consumption of 2436 pounds of coke per ton of 2268 pounds. Some doubt has been expressed in the past as to the ability of a Southern furnace to hold a low fuel consumption for any long continued period. The record given above dispels that doubt. Since the plant has only one stack the question cannot arise that the results have been achieved by applying any blowing or heating power belonging to other furnaces. The iron made is reported to be exceptionally strong and fine in quality as a foundry iron.

The *Mechanical World* of London reports that a new bullet proof shield was lately tested at the works of Charles Cammell & Co., Sheffield, England, with complete success. The shield, which is the invention of Captain Boynton and is manufactured by the firm above mentioned, takes the form of a plate of specially prepared chrome steel, with a slot in the top for the soldier's rifle. The weight is less than one-half that of a life guardsman's cuirass, and the material has such powers of resistance to a sudden shock that it is proof against the service bullet propelled by cordite through a Lee-Mitford barrel at 30 yards distance. A bullet which would pass completely through an oak plank 3 inches thick is powerless to do more than make a slight indentation in Captain Boynton's plate of steel only  $\frac{3}{16}$  inch thick. Mr. Tucker, R.E., fired five shots at one plate from a Lee-Mitford rifle, and placed his shots as near as possible in the same spot. This test was withstood by the plate, and there was not the slightest indication of the shield being perforated.

The Gohna Flood.

The story of the Gohna landslip and its sequel is so extraordinary that it deserves to be told in some detail, now that the bursting of the dam and the flooding of the valley have taken place in the exact manner and almost on the exact day which had been foreseen. We are enabled to do this through the careful investigations of Thomas H. Holland, published in the latest issue of the records of the Geological Survey of India. The scene of this curious story is in a Himalayan valley, in the district of Garhwal, between the sacred city of Hardwar on the Upper Ganges and the Tibetan frontier. It is a land of immense mountains, separated by valleys so narrow that they may almost be called ravines. The chief of these is the valley of Srinagar, through which runs the river Alaknanda, an object of profound reverence to devout Hindoos. A tributary of this river is called the Birahi Ganga, and 8 miles above its junction with the larger stream is the small village of Gohna, situated 160 miles from Hardwar. Close to Gohna was a hill called Maithana, precipitous

best scientific ability and the power of making full use of it. At the time of Mr. Holland's visit, the lake was less than 3 miles long, and before it could overflow its length must reach 7 miles. Yet the date was exactly calculable, as was the course of the water after reaching the limit. "The lake," he wrote, "will be full and will overflow the barrier about the middle of August. Means of recording by instantaneous photographs the effects of the water on the dam are being carefully arranged by the government of the Northwestern provinces."

Again, speaking of the point at which the overflow would begin, the writer said: "When full the lake will, unless a cutting is made, overflow at the point referred to as 5850 feet above the sea level; and the stream, rushing down an incline of 11°, will rapidly cut with increasing head a channel in the mud and loose stones, until its speed is checked by the reduction of slope and the exposure of large blocks of dolomite, which must occur below at no great depth." This is just what has now occurred. The water reached the top on Sunday morning, August 26, and by midnight had begun to escape in great volume. The heavy rush took place at night, and by 4.30 a.m. some 320 feet of water had escaped, the lake sinking to a quarter of its maximum size in that short space of time. It can easily be imagined that the rush of water down the valley was prodigious and we need not be surprised to read that great destruction of buildings took place between Gohna and Hardwar. But, in spite of this tremendous outburst of force, no lives appear to have been lost, either in the valley or in the towns exposed to the water, though a column 6 feet deep is reported to have made its swift way through Hardwar. The administration had exerted itself splendidly and its work was crowned with complete success. Telegraphic warnings had been flashed down the valley and every man had been told beforehand exactly what to expect. The warnings were listened to and every human being appears to have kept safely out of the way.—*London Times*.

The first keel plate of the new first-class British battle ship "Prince George" was laid a short time ago in Portsmouth Dockyard. When completed the vessel will have a displacement of 14,900 tons. She will be 390 feet long and 75 feet in beam, and under forced draft, with an indicated horse-power of 12,000, her engines are expected to develop 17.5 knots an hour; and under natural draft, with a horse-power of 10,000, she will attain a speed of 16.5 knots. Her mean load draft will be 27 feet 6 inches, and she will have a coal capacity of 900 tons. The armament of the "Prince George" will be four 12 inch breech-loading guns, mounted *en barbette*, and 12 6 inch guns, with 28 smaller quick firing guns, in addition to machine guns and torpedoes, making her one of the most powerful war vessels ever floated.

The Cincinnati *Commercial Gazette* of September 30, in reviewing the local labor situation at the close of the month, remarks as follows: "A careful résumé of the condition of the labor situation locally admits of the belief that at no time during the past year have the conditions been more favorable and the indications for a general improvement in the immediate future better than at the

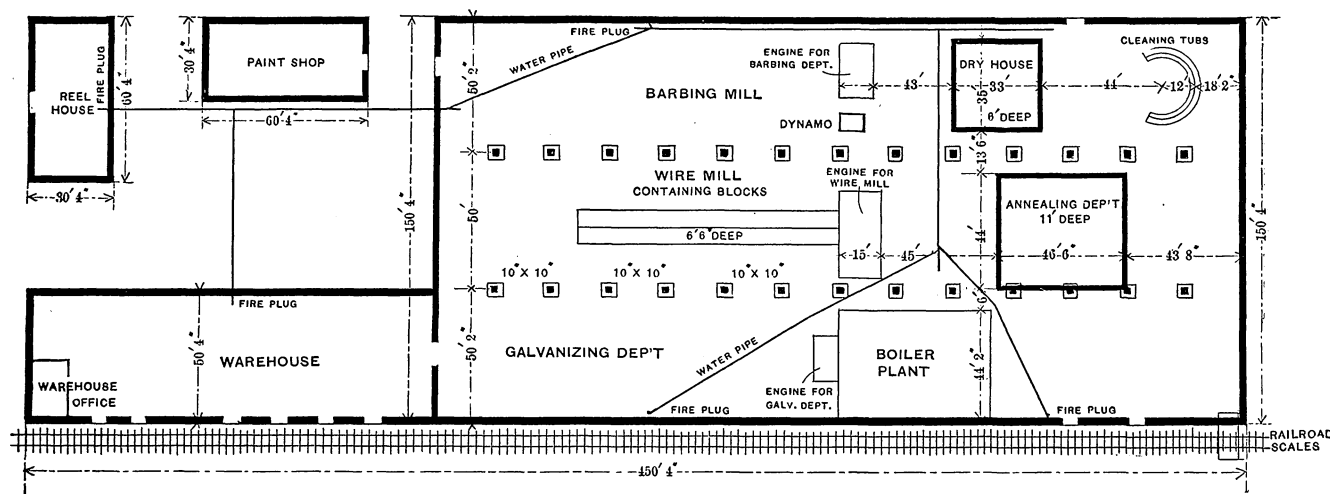
present time. The ranks of the unemployed are gradually but surely being reduced, and a most thorough investigation fails to reveal the fact that there is, at present, any severe suffering from lack of work, though there are still many persons throughout the city who are still out of work. Reports from a number of mills and factories of different kinds indicate that the working forces in many will soon be increased and there is a general feeling of hopefulness."

### The New Works of the Continental Wire Company.

The Continental Wire Company, St. Louis, Mo., desiring to increase their capacity, and not having sufficient available space at their old location, decided to build at Granite City, Ill., the new St. Louis manufacturing suburb, as that point offered more inducements in the way of cheap fuel and better railroad facilities than could be procured elsewhere. Negotiations were

with No. 20 corrugated iron with two coats of metallic paint. In addition to 76 windows on each side of the building for the purpose of securing light and ventilation, there is a Texas the full length of the building 3 feet 6 inches in height, the sash being adjusted so the windows can be opened or closed as desired. There are also 12 arc lights and 50 incandescent lights, so that the night twin will be as well supplied with light as the day turn. The light is furnished by the company's own electric plant. There are no openings in the north wall of the main building with the exception of the door from the barbing factory and the door from the galvanizing department, which doors are wholly of iron. On the east side of the building there is only one door, all other openings except the windows for light being on the west side. That portion of the paint house and reel house facing the main building contains no openings except one iron door in each building, this reducing the possibility of fire to the lowest possible limit. In addition to these precautions

painted will be transferred immediately along the right, or east side, of the factory from the muffs or annealing pots into the barbed wire factory. After being barbed it is transferred immediately to the paint house, which is 40 feet distant. After painting it is then taken to the warehouse, about 60 feet distant. The galvanized wire is transferred directly through the north door of the galvanizing department of the factory into the warehouse. The railroad siding extends the full length of the lot, about 600 feet, and the openings into the factory and warehouse are so constructed that three cars of rods, two cars of coal, two cars of coke and six cars of finished product can be loading and unloading simultaneously. Immediately next the north wall of the warehouse is a tramway with trucks, upon which the reel stock will be transferred to the reel house. These trucks will run down the tramway to the reel house by gravity. The entire plant is modern in design, construction and finish, has a capacity of 100 tons daily, and has been constructed with a view to doubling the



THE NEW WORKS OF THE CONTINENTAL WIRE COMPANY.

opened with the Niedringhaus Brothers, the incorporators of Granite City, and six acres were purchased upon which to erect their plant, which is now completed. In the design of the plant it has been the endeavor of the company to combine every feature of economy, from the receipt of the raw material in the shape of wire rods to its completion as finished plain wires and painted and galvanized barb wire. The lot upon which the plant is erected is 590 feet in length and 450 feet in width. The main brick building is 300 x 150 feet, and contains the barbing mill, wire mill and galvanizing departments. The stone foundation of the building is 30 inches beneath the surface, rising to 3½ feet above the surface to a level with the floors of the cars, thus diminishing the cost of handling to the lowest possible limit. The stone walls are 2 feet thick at the base, tapering to a width of 18 inches at the top, excepting where the pillar foundations require an extension of 9 inches. The wall is 13 inches, supported by pillars every 21 feet, which are 18 inches wide and 9 inches deep. Upon each of these pillars the truss for the roofing rests. The roof is supported by two rows of 10 x 10 inch posts, of which there are 26, each row being 50 feet from either wall. The height of this building will be 17 feet at its lowest point and 32 feet in the center of the division. The roof is covered

to make the building fire proof, six fire plugs, each having 75 feet of canvas hose, are erected, which are 75 feet distant from each other, and each has a stream of sufficient force to carry the water over the entire building. Two of these are placed on the east side, and two on the west side of the main factory building, one in the center of the warehouse and the other near the south door of the reel house.

The machinery is of the latest pattern and design, and every convenience has been introduced which will tend to increase the output without lowering the high quality and finish of the goods manufactured. The company's product will consist of painted and galvanized barbed wire, annealed and galvanized market wire, and soft steel baling wire. The engraving which we present herewith represents a ground plan of the entire works. The rods will be received at the southwest corner of the factory, being transferred immediately from the cars to the cleaning department. Adjoining the cleaning department will be found the dry houses, where the rods are made ready for the wire blocks. The wire to be annealed, when drawn, will be returned from the east side of the blocks to the annealing pots, while the wire to be galvanized will be transferred immediately from the west side of the bench directly into the galvanizing department. The wire to be barbed and

capacity with the smallest possible outlay.

Five leading Eastern and Northern trunk lines have their tracks immediately in front of the works, and each has connection with the switch and siding of the works, thus giving the Continental Wire Company the best possible shipping facilities. The five lines referred to are the Wabash, Chicago & Alton, Big Four, Chicago, Burlington & Quincy and the Bluff Line. In addition to these five lines immediately adjoining the switch and siding of the Continental Wire Company is the track of the Granite City Belt Line, which connects with all the lines running South and West, practically giving them direct connection with all points of the compass. Freight rates to points West and South are the same from Granite City as from St. Louis proper, so that the Continental Wire Company will have all the advantages of low freight rates and quick shipment that are possible to obtain. The company have erected a number of dwelling houses for their employees, and they are already all occupied.

A new plant for the manufacture of incandescent lamps, and having a capacity of 20,000 lamps a day, will be erected by the Westinghouse Electric Company, at Allegheny City, Pa.

## Washington News.

(From our Special Correspondent.)

WASHINGTON, D. C., October 9, 1894.

The chiefs of bureaus in the departments representing the fighting arms of the Government, and particularly in naval and military ordnance and naval construction and steam engineering, are now busily engaged in preparing their annual reports, which will be laid before the chiefs of their respective departments before the close of the present month. General Flagler and Commodore Sampson will have an interesting official story to tell about the remarkable progress made during the year in the improvement and manufacture of high power great guns, small arms and ordnance equipment. Commodore Hichborn will also tell of the rapid advance made toward the completion of the great floating fortresses, fleet cruisers and smaller craft of the gunboat and torpedo classes which are still on the stocks, or which have been "thrown overboard," as "Jack" would say, during the past year.

While this bureau will have no new work on hand, except the construction of the three torpedo boats and tug authorized during the late session of Congress, Chief Hichborn, whose name is famous as a naval constructor, is never forgetful of the possible demands and necessary advancement of the future in order to keep pace with the progress of other maritime nations in the design of ships of all classes for warlike purposes.

Commodore Melville, who is the distinguished head of the propelling branch in naval tactics, can point with pride during his past official year to the achievements of the "Minneapolis," the mistress of the sea in speed, and the eminently successful practical demonstration of the steam machinery in all the vessels put to their speed trials during the past year. In no branch of the public service have the grandeur, progress and power of this Government been brought more potently face to face with the outer world than through the wonderful realizations of the genius of Hichborn and Melville.

It was only a few years ago when the nations of the world were winking at each other in derision of the American navy. England, second rate in everything as compared with the United States, was particularly forward in her amusement at our expense. To-day the rub in the race is on the other side. Her crown prince and admiralty chiefs have been diving and lauding the admiral and officers of the American fleet for the wonderful merits of their ships, their machinery, armament, equipment and discipline, and their own merit as masters of the profession of the sea and war.

The German Kaiser asks to see one of these wonderful evolutions of American fighting genius, and experts from all nations, including China and Japan, make them their admiration and study.

The official progress of the past year will therefore be exceptionally interesting, not only at home but to persons of professional connection with such matters abroad.

The chiefs of these important bureaus will make some very important recommendations to the Secretaries of War and Navy, looking to more progressive work in land and sea construction and equipment for warlike operations, offensive and defensive. The Government,

after a vast outlay of public money, finds itself in possession of public plants and private facilities for the most advanced stage of shipbuilding and ordnance manufacture. They regard it as public economy to keep these plants in operation and a public benefit to utilize reasonably private enterprise. In the gun shop at the Washington Navy Yard, among the other monsters of modern ordnance may be seen a 10-inch breech loading rifled high power gun with an 8 inch bore. Externally it does not differ from the other 10-inch guns and internally it differs only in the mechanical treatment of the bore and chamber. In the words of Ordnance Superintendent Jewell, United States Navy, "The gun itself does not differ from any other of the same caliber; the difference is in the application of the multicharge principle to the propulsion of the projectile." The powder chamber of the gun is 6 feet long and 11 inches in diameter, while the bore is adapted to an 8-inch projectile. The cartridge, if it may be so termed, is a copper cylinder 4 feet in length and 1 foot in diameter. The cone shaped projectile of armor piercing steel is 8 inches in diameter and 15.3 inches long, protruding from the head of the cartridge, and is held in position by a steel tube 66 inches long by 4 inches inside and 6 inches outside diameter, which extends into the copper cylinder cartridge by means of a tail 30 inches long and 4 inches in diameter inserted in the steel tube, which is held in position by means of a brass head perforated with a row of holes about 1½ inches in diameter around the tube and equidistant between the outer surface of the tube and the outer circumference of the copper cylinder. Between this steel tube and the copper outer casing of the cylindrical cartridge is stored the second charge of powder.

This immense 10-inch cylinder with its projecting 8 inch projectile is placed in the chamber by the usual breech mechanism, the projectile fitting into the 8-inch bore.

The first charge, which gives the initial velocity, which is about 400 f. s., is about 10 per cent. of the whole charge. As the projectile leaves the gun the main body of the charge explodes through the openings in the brass head, being ignited by the flame of the primary charge. The primary charge is placed in the cartridge at the bottom of the steel tube. The whole charge is 125 pounds. The projectile weighs 250 pounds. It is expected that this principle will develop an initial velocity of 2500 f. s. on leaving the gun, with a flight of 10 miles. The inventor, Mr. Hurst of Mississippi, expects to show 2700 f. s. The best work of an 8-inch projectile under the present system is 2100 f. s. and 8 miles range. The saddle of the gun is now being completed. The ten experimental shells with an iron projectile are also ready to receive their charge.

The lack of success in former efforts to utilize the multicharge principle increases the interest in this new attempt. Congress made a liberal appropriation—\$50,000—for the manufacture of a gun and ammunition on Mr. Hurst's plan. If this attempt should not succeed the gun, which is longer than the ordinary one, will not be useless, as it can be sawed off to the regulation length of its caliber and be bored into a 10-inch gun. The most thorough test will be given it at Indian Head in about two weeks. The removal of the gun to Indian Head may take place next week. The only delay will now be in getting the ammunition ready. The scientific

observations connected with the firing will be very close.

Commodore Sampson, Chief of the Bureau of Ordnance, U. S. N., made a flying trip to Bethlehem, leaving here on Friday night, for the purpose of witnessing the test of an 18 feet 2 inches by 6 feet 4 inches by 12 inches to 6 inches Harveyized steel plate selected from a group of 300 tons of side armor for the battle ship "Texas." The official report will not be ready for several days. Unofficial information, however, indicates that the resistance of the plate to an 8 inch projectile at velocities of 1678 and 2004 foot seconds was remarkable. The penetration was but 6 inches and 8 inches, and the plate is reported practically uninjured.

It is evident since the bad odor in which the Carnegie Company have brought themselves through alleged un-American intrigues against the interests of the steel making trade in the United States, in business methods and legislation, and latterly with Congress and the Department, that the Department chief and expert naval officers are very much gratified with the advances made by the Bethlehem Company and their achievements in armor plate making. It is evident from a recent conversation of Chairman Cummings that he intends to prosecute his Carnegie legislation in the direction of heroic treatment. If he had his way it is doubtful whether any more Government work would be given to that company, even in conformity with the practice which rules in the award of bids if the lowest, as responsibility is also a factor. The chairman has Congress most emphatically with him when political capital is eliminated.

The Rose Island range, near Newport, R. I., will for some time be the center of interest for ordnance experts. The Naval Small Arms Board have notified the Bureau of Ordnance of the commencement of their labors. While the tests themselves are not expected to consume any extraordinary length of time, it may be several months before a report can be completed, as this part of the work will go into the minutest detail of drawings and description. The Hotchkiss Company present two guns. There are also the Miles and the Van Patten small arms presented for test. In the matter of small arms the naval authorities propose the latest and the best for the new equipment.

The Pennsylvania Automatic Telephone Company of Pittsburgh have received a charter of incorporation. The new concern propose to enter into the business of selling the patent rights for a telephone switch board cut off, an invention by the use of which the central office is prevented from hearing the conversations of subscribers over the wire.

Milwaukee advices state that the Metropolitan Iron & Land Company, whose headquarters are in Milwaukee and who operate the Norrie mines and the Pabst mine on the Gogebic, have decided to continue a good sized force of miners at work during the entire winter.

It is reported that a new railroad line is to be built down the San Joaquin Valley, Cal., to compete with the Southern Pacific. The name of the new road is the San Francisco, Stockton & San Joaquin, and the capital stock is reported at \$6,000,000.



### A Huge Excavator.

The Chicago drainage canal is occasioning great improvements in the methods of excavating rock and earth on a large scale. The steam shovel was considered a wonderful economizer of labor when it was first perfected, but the machinery now in use far surpasses the achievements of the steam shovel when merely used for transferring earth and rock to cars alongside. The Brown hoisting and conveying machines have been brought into requisition for discharging excavated matter on huge dumps along the banks of the canal, thus making the work of the steam shovel much more efficient. The most remarkable machine, however, in point of size and capacity for work, is the Hoover & Mason excavator and carrier. It was designed by A. J. Mason and Frank H. Hoover of Kansas City, and is working on the Gahan & Byrne contract. This machine is 640 feet in length, is constructed of steel truss work throughout, and resembles a cradle in shape. The body is 320 feet in length, from each end of which extends a cantilever projection, one being 178 feet in length, with its tip 90 feet from the ground, and the other being 142 feet long, with its tip also 90 feet from the ground. The body of the machine extends across the bed of the canal and on each bank rests on huge steel flat cars of the Krupp gun car pattern, which move on a broad gauge track. Four plows are operated in the canal bed by a large chain moved by a 50 horse power engine. Two scrapers connected with the plows throw the earth on an endless conveyor consisting of a series of steel pans. The conveyor passes out to the end of either arm and empties the earth either into cars or on a dump as desired. An engine of 175 horse-power operates the conveyor. It is stated that this machine reduces the cost of earth excavation as low as six cents per cubic yard, while contracts have been let on the canal at rates varying from 17 to 30 cents.

Within a very short time work will be commenced in this country on the erection of several blocks of coke ovens with a view to utilizing the by-products. We are advised of the formation of an organization known as the Otto Coke & Chemical Company, which concern have secured in the United States and Canada the exclusive rights for the erection of the Otto-Hoffman and Otto-Coppee by-product coke ovens. The officers of the new concern are as follows: Powell Stackhouse, president; W. G. Mather, vice president; Samuel Mather, treasurer; James H. Hoyt, secretary, and John F. Wilcox, general manager. It is the intention of this concern to commence work at the earliest possible moment on the erection of several blocks of ovens of the above types. For the present the headquarters of the Otto Coke & Chemical Company will be in the Lewis Block, Pittsburgh, Pa.

The Twin City Iron Works of Minneapolis, Minn., have recently begun the manufacture of a fire proof door for use in warehouses and other buildings, for the Fire Proof Door Company of that city, who own the patents. It was necessary to build hydraulic machinery for the purpose, but the company proved equal to the emergency and erected a press of large size, capable of exerting a pressure of 4000 pounds to

the square inch, and weighing 26 tons. The door is composed of two sheets of steel or copper, as may be desired, which are pressed into panel form to conform with any design specified. These sheets are fitted over a wood frame and the inside filled with mineral wool, making them perfectly fire proof. The frame is grooved and the steel pressed into the groove, and it is then fitted with a steel band which extends all around the door, making it per-

### New Drilling, Boring and Tapping Machines.

A series of drilling, boring and tapping machines of new design are being built by Beaman & Smith of Providence, R. I., to whom we are indebted for the following data:

#### Spindle Drilling Machine.

The general design of this machine will be understood from the illustration.

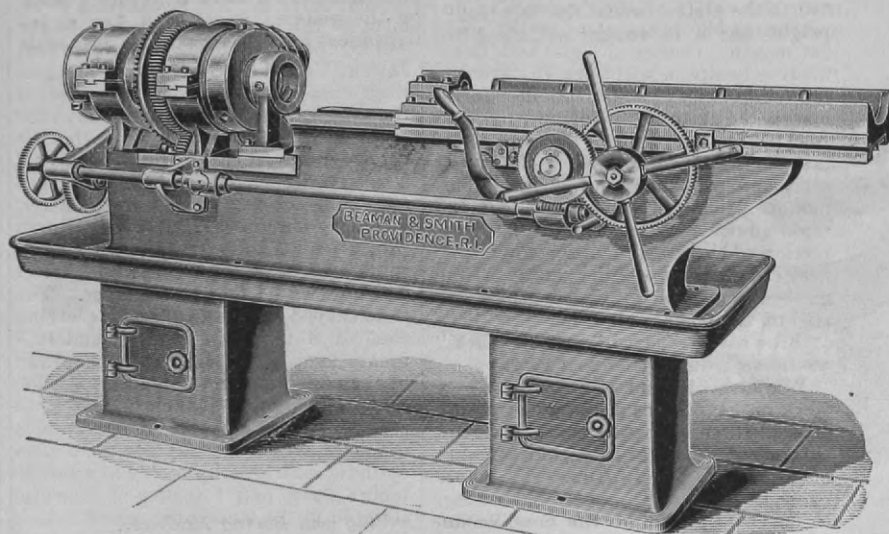


Fig. 1.—Spindle Drilling Machine.

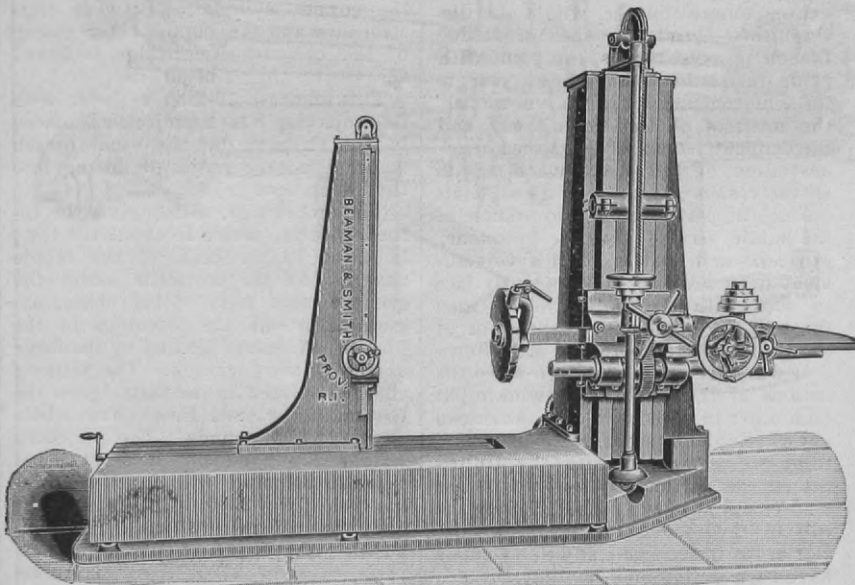


Fig. 2.—Horizontal Spindle Drilling and Boring Machine.

### NEW DRILLING, BORING AND TAPPING MACHINES

fectly strong and rigid. These doors can be finished up in nickel, copper, brass or bronze. The casings are made with the same protection.

A strike of the miners operating coal mining machines in Ohio is probable. The machine scales have never been adjusted to the new scale adopted in the strike settlement last June. A mass meeting of miners, held last week, resolved to strike if the machine operators do not propose a satisfactory scale within a short time.

tion, Fig. 1. It is intended for drilling or chucking holes through spindles for hollow spindle machines, though other long pieces can be drilled if less than 6½ inches outside diameter and 30 inches or less in length. The drive cone is for 3-inch belt and of four sections, geared four to one of the spindle. The countershaft has two speeds, which gives eight spindle speeds from 27 to 114 revolutions per minute. The slide has over 36 inches movement by hand or power. The power feed, with automatic stop, is positively geared and gives 1/10-inch movement to one revolu-

tion of the spindle. The thrust of drilling is taken against a ball thrust bearing of 63  $\frac{1}{8}$ -inch hardened and ground steel balls. This machine weighs complete 5000 pounds.

#### Horizontal Spindle Drilling and Boring Machine.

This drilling and boring machine, Fig. 2, consists substantially of a platen and two uprights, with traveling spindle head on one. The platen is 30 inches wide and about 12 feet extreme length. The top is 15 inches from the floor. The right hand upright is fastened to the platen, while the left hand upright has a movement sufficient to

larger work. The feeds are from  $\frac{1}{16}$  to  $\frac{1}{32}$  inch per revolution of spindle.

This machine is designed to meet the demands of printing press, cotton and woolen machine makers, for frame drilling, boring, &c. This tool weighs 15,500 pounds.

#### Adjustable Four-Spindle Drilling and Boring Machine.

The illustration, Fig. 3, shows clearly the character of this machine. It is used for drilling or boring from one to four holes at a time. The work is stationary and located in a suitable fixture placed on the platen. Each head has an independent hand or automatic feed with

driven direct by a 3 $\frac{1}{2}$  inch belt over 20-inch pulleys geared 6 $\frac{3}{8}$  to 1 for boring, and back geared 40 to 1 for threading. The shipping action on the front of the machine, always in reach of the operator, makes the change. The platen is 14 inches wide and 10 feet long and 24 inches from platen to saddle which carries the spindle heads. The top of the platen is 20 inches from the floor. The feed is automatic and can be thrown in or out from in front of the right hand spindle; the reverse motion on the countershaft admits of backing out taps or threading tools. The spindles are counter balanced. The machine weighs, complete, 15,500 pounds.

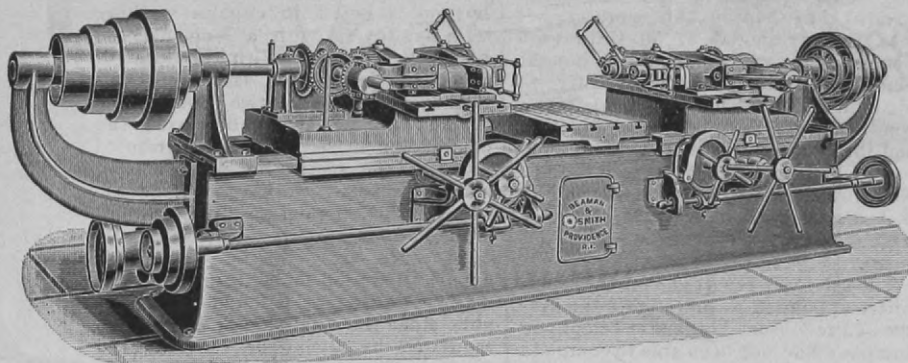


Fig. 3.—Adjustable Four-Spindle Drilling and Boring Machine.

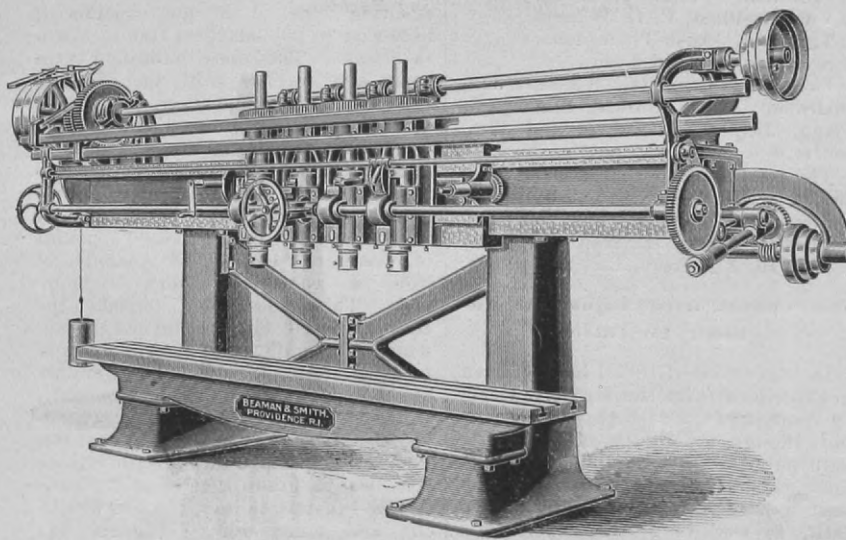


Fig. 4.—Four-Spindle Upright Boring and Tapping Machine.

#### NEW DRILLING, BORING AND TAPPING MACHINES.

take a position from 18 to 72 inches from the right hand upright. The spindle is 3 $\frac{1}{2}$  inches diameter, has 24-inch movement by hand or power, and has vertical movement by hand, so that its center can be brought down to within 2 $\frac{1}{2}$  inches from the platen and raised to 60 inches. The disk shown in front of the spindle is a jig plate or drill guide. It can be revolved and indexed quickly to present the size of hole required. This is supported on a 3 inch square steel bar, which slides endwise through the head to any position. The left hand head can be brought to correspond with the spindle to support the end of small boring bars. Both heads are counterbalanced and readily moved. The spindle is geared direct 3 to 1 for small drills and 10 to 1 for

quick return. The spindles are adjustable from 5 inches to 18 inches between centers. Each has No. 4 Morse taper hole in the end and by an ingenious arrangement on the spindles tools can be removed without stopping the machine. The bed is of sufficient length to take in 48 inches between the spindles. The platen is 20 inches wide and T-slotted, as shown. This machine weighs 11,000 pounds.

#### Four-Spindle Upright Boring and Tapping Machine.

This machine, Fig. 4, is designed for boring and threading steam or water branch connections up to 12 feet in length, with openings from 11 $\frac{1}{2}$  inches to 16 inches center to center. The spindles are positively connected and

**Preparation of Chromium.**—From some new researches of Henri Moissan upon chromium, it results that through the use of the intense heat produced by the electric arc it is possible to prepare fused chromium in very large quantities. The product may be refined either by fused lime or by the double oxide of calcium and chromium. The metal obtained under such circumstances is less fusible than platinum. It may be filed, it takes a beautiful polish, and is not attacked by atmospheric agents. It is attacked but slightly by acids and resists aqua regia and alkalies in fusion. This preparation of chromium will permit of efficaciously studying the alloys of the metal. United either with aluminum or copper, it gives, in fact, some very interesting results. Pure copper, alloyed with 0.5 of chromium, has its toughness nearly doubled, and the alloy, which is capable of taking a beautiful polish, alters less than copper does in contact with moist air.

Says the Philadelphia Ledger: Unless calculations fall Cramps' great plant will be the scene of one of the largest demonstrations ever witnessed in an American shipyard during the month just begun. The occasion will be the launching of the giant hull of the new American liner "St. Louis," the largest vessel up to the present date ever built in the United States, and the first American built vessel to contest with all the famous ocean racers of the day for the supremacy of the American merchant marine. Hundreds of skilled workmen are working on the "St. Louis" and the "St. Paul," and it is hoped that the former will be launched before the month is out, and that the "St. Paul" will soon follow. These vessels are certainly magnificent types of the great ocean flyers, and a list of prominent guests from many cities will be present at the launching. Work on the big Government vessels is going on rapidly, and the hulls of the armored cruiser "Brooklyn" and the sea going battle ship "Iowa" have assumed their formidable shapeliness. As big as these war vessels are, they look somewhat reduced in size as their hulls loom up against the giant liners. The "Minneapolis" is nearly ready to be commissioned, and the battle ship "Indiana" is receiving the long delayed armor for her sides, and she will soon undergo the official trial. The "Massachusetts" will shortly undergo her unofficial trial.

Improvements to the water works system of Minneapolis, estimated to cost over \$1,000,000, are recommended by the City Engineer, and will probably be undertaken.



## The Foundrymen's Association.

The regular monthly meeting of the Foundrymen's Association was held at the Manufacturers' Club in Philadelphia on Wednesday, October 3, the president, Francis Schumann of the Tacony Iron & Metal Company, Tacony, Philadelphia, occupying the chair.

Secretary Howard Evans announced the death of Thomas Green of the firm of Green & Linehan, Frankford, Philadelphia, and Recorder of Deeds for that city, a member of the association.

The Executive Committee reported that since the passage of the new tariff bill there had been little improvement noticeable in the foundry trade. In some cases there had been an increase in the number of inquiries received, but resultant orders were limited and prices were exceedingly low. A leading foundryman had stated that it was necessary in every instance to name the lowest price at which he could supply his castings before taking the order, and his case was a fair sample of the average. A customer obtained a quotation and then huckstered around to see if he could not do better before placing an order. In times past this was not the case, as the customer was satisfied, under ordinary circumstances, to have his wants filled by the same foundry. The committee hoped to see the time when this would occur again, and when it came they would be perfectly satisfied that business had improved. The foundry business, however, was not the only one that had been affected by low prices, as almost all interests had felt the depression during the last year or more. For instance, wheat and cotton were lower than they had ever been. The committee heard of some foundries quite busy, and of another that had been busy, but at the present time there were but few orders on hand, showing the spasmodic condition of the market. Much improvement was not looked for until after the election, or it might be spring before any would be noticed.

The Price Committee was next called upon to report by sections. Two sections only reported.

*Sash Weights*—For this section E. E. Brown of E. E. Brown & Co., Philadelphia, reported that there was no improvement whatever in prices—if anything they were lower than ever. There was a little improvement noticeable in the volume of business.

*Cast Iron Gas and Water Pipe*—P. D. Wanner of the Reading Iron Foundry Company, Reading, Pa., in reporting for this section of the committee said that the situation was unchanged. One thing he said he could not understand and would like to be enlightened upon, and that was why, in a trade like the cast iron pipe trade, where pipe men had had a really good trade for the last two or three months and many foundries were filled with orders that would run to the end of the year, prices should be so low, in fact barely above cost. Founders had lost thousands of dollars during the earlier part of the year, or previous to July, and in the face of that fact and when there was a reasonably good run of business, they did not ask for better prices. It appeared to him as though the life had been driven out of everybody and there was no courage or backbone left. Or was, he said, the condition founded upon envy, jealousy or a lack of good business capacity?

Walter Wood thought the reason was

perhaps that founders did not know where to get orders just when they wanted them. It was not, he said, the volume of business, but the confidence of getting business when it was required. When a founder knew he could get an order when he wanted it he could get better prices.

Mr. Devlin believed that there was a general tendency in the iron business to lower prices and had been for some years. He thought it was owing to overproduction in certain lines. People were crowding one another in their bids for trade. Buyers were afraid to buy because if they bought one day they might find they could have bought cheaper the next. He did not think the tariff had anything to do with it. Pig iron was higher in England at the present time than in this country. It was that day quoted at 59 shillings 6 pence. The same iron could be bought here for \$12 and there was \$4 duty on pig iron under the new tariff. It was a condition, he said, of overproduction and the country was not able to consume what they were able to produce. No railroads were being built and in that direction there was the loss of a large consumption of iron in various forms.

The secretary reported that the committee appointed to investigate the system of the Mutual Automatic Telephone Company had not been able to complete their investigation. Nominations for office in the association during the ensuing year being next in order, the following nominations were made:

President, Francis Schumann.  
Vice-president, P. D. Wanner.  
Treasurer, Josiah Thompson.  
Secretary, Howard Evans.  
Executive Committee, Walter Wood, chairman; Thos. Glover, Stanley G. Flagg, Jr., E. E. Brown and Wm. Sauter.

The treasurer reported a balance of \$62.98 in the treasury and all bills paid. Under the head of new business, Stanley G. Flagg, Jr., read a paper by J. B. Nau, Allegheny, Pa., as follows:

### New Cupola with Adjustable Annular Air Inlet.

In the course of 1891 I had occasion to experiment with the Hertz steam jet cupola, at Elizabethport, N. J., and though the results of those tests were published at the time, I wish to again call attention to some of the most important features of the cupola itself, as well as to the experiments made. The cupola was invented in Germany a few years ago solely to afford means to avoid the use of blowers, which sometimes are very annoying on account of the unbearable noise created while running. In the absence of blowers the draft in the cupola is produced by means of a steam jet, located generally in the upper part of a downcomer connecting the top of the cupola with the smoke flue. This downcomer is necessary because the top of the cupola is closed by an ordinary hopper arrangement. The steam jet issues from a nozzle of about  $\frac{3}{4}$  inch diameter and the steam is furnished by a nearby boiler. The air is thus sucked into the cupola by the vacuum created at the top by the action of the steam jet. No tuyeres are used for the air to enter. No wind box is required. Instead of tuyeres, the inventor separated entirely the hearth from the upper shaft and the air enters through the annular opening left between the hearth and shaft. The hearth, furthermore, is mounted on screws supported by a truck, thereby

permitting control of the air inlet by raising or lowering the hearth.

The application of this annular opening to admit air to the cupola proved to be an excellent invention. In ordinary tuyere blown cupolas a certain pressure is necessary in order to admit the same amount of air. When the pressure is heavy, as is often the case, the air is driven at once right to the center, where the different air jets meet and rise at once to the upper region. Of course, it will be easily understood that right in the line of the tuyeres the combustion is greatest, while it is less in the space between two consecutive tuyeres. This produces an irregular combustion and causes a greater amount of fuel to be burnt.

It is generally admitted that the combustion is better in cupolas working with flat tuyeres with a long, narrow, horizontal section. With this kind of tuyere the dead space, as we may call the space between two consecutive tuyeres, will be largely decreased, the combustion more regularly distributed all over the section of the smelting zone and better working will be the result. The annular air inlet, open all around, does entirely away with the dead space, since the air enters the cupola all around in as thin a sheet as may be desired or is found most suitable, since the admission of air may be regulated by raising or lowering the hearth. The combustion will be most equal.

The good results obtained in this cupola are, undoubtedly, entirely due to this regular and equal combustion in the smelting zone. I do not consider it necessary to publish these results again *in extenso*. They were published three years ago in *The Iron Age* of June 18, 1891. I will, however, recall the most important figures: The cupola was a 2 ton cupola, melting 2 tons an hour. The coke burnt amounted to 6 per cent. of the weight of the iron, or 1 pound of coke to 16 pounds of iron melted. Ordinarily 1 pound of coke to 12 or 13 pounds of iron is considered very economical. This does not include the coke required for lighting the cupola, which is insignificant if the cupola runs for a certain number of hours. The loss of iron amounted to only  $3\frac{1}{2}$  per cent., which is light. Another great advantage resulted from the fact that the iron in its passage through the cupola lost less in grade than in an ordinary cupola—that is to say, the loss of silicon and some other elements was greatly reduced, due to the gentleness with which the air enters the cupola and its equal distribution over the whole section.

The consumption of steam for a 2-ton cupola is not too high. When, however, the capacity of the cupola is increased, the amount of steam required for the suction increases considerably, and in cupolas of about 10 tons or more the consumption of steam increases so rapidly that its use soon counterbalances the economies derived from the other good features of the cupola.

In order to avoid these disadvantages I tried to arrange the cupola in such a manner that the annular adjustable opening could be applied to a blown cupola without using a steam jet. Of course, in this case a wind box will be required, in the interior of which the annular opening must be located. Furthermore, it being required to regulate the air inlet, it must still be possible to raise or lower the lower part of the cupola in order to decrease or increase the

height of the opening. This means the use of an adjustable wind box, remaining perfectly air tight while the annular opening is being regulated.

The cupola described here offers all the advantages of the Herbertz cupola—viz.: 1, Perfectly uniform combustion; 2, entirely controlled air inlet; 3, movable hearth. The hearth is also provided with a drop bottom, whereby when the cupola's work is done everything can be dropped out.

A certain number of peep holes are located all around, through which the combustion can be watched and the annular air inlet cleansed from possible clinkers that may block it in certain parts. In such places where the cupolas run a whole week without stoppage, as in steel works, for instance, another great advantage results from the possibility of substituting almost without loss of time a ready made hearth for a burnt one and lighting the cupola up again.

The following paper by Thos. D. West, Sharpsville, Pa., was then read: **Comments on Free Draft and Steam Jet for Cupolas.**

Mr. Nau's paper having been handed me for criticism, I would in the first place say that the feature of running a cupola without requiring the use of a blower and its accompanying evils, countershafts, belting, &c., which every foundry has had some experience with in the matter of "break downs," causing bunged up cupolas, late heats and often serious loss, is one to command consideration no matter what other points might appear as not strictly adverse to present practice. There are very few foundrymen in the machinery line who do not experience a suspicious feeling of the unexpected occurring in the way of a "break down" when starting a heat to run off some urgently required casting or a special heavy heat. For some unexplainable reason this generally occurs at the worst time. I know that as far as I am concerned, I would feel greater assurance of a heat always passing off successfully if my cupola could be made to melt by simply a draft. Then, again, such a principle commends itself from the point of not requiring wind boxes and tuyeres, which are so easily filled up with slag and iron. I would have liked if Mr. Nau had dwelt at greater length upon the steam jet and explained more in detail the experience of those having used it. He leads me to think that in the larger sizes of cupolas it is not so economical as forced blast. Has Mr. Nau figured any upon the idea of using two small cupolas to do the work of one? There are cases where such would be found to be advantageous. For instance, some shops have work which they would like to commence pouring off in the morning, and then toward the close of the day increase their melting capacity for two or three hours. Two small cupolas in such cases might often be more practical than having to start off with a big cupola, and they are often much more economical. Then, again, with the principle involving a free draft, I know of no design of cupola which could so well adopt the "center blast" tuyere for the reason that if iron did leak down through it no harm could be done in the way of closing up pipes, &c. I like very much the idea of abolishing wind boxes and forced blast. If a cupola can have an annular opening entirely free of wind boxes, &c., so that what air the cupola receives for combustion is simply sucked in by draft, there is no

reason why a center tuyere such as presented by the writer before the Western Foundrymen's Association, October 18, 1893, could not be worked in connection with it. Ample time would be afforded the oxygen of the air to well combine with the carbon of the fuel before escaping beyond the melting point, hence giving us results so essential to economy of fuel and rapid melting. I am much inclined to believe that were the "center blast" given a trial in combination with a free draft annular opening tuyere passage, such as presented by the Herbertz steam jet cupola, much less steam would be required to make a large cupola economical, because the center blast supplies the middle portion of the cupola with air for combustion. This would remove Mr. Nau's doubts as to the impracticability of running a large cupola simply by means of an annular tuyere opening and a steam jet to create draft or blast. I am strongly of the opinion that it is among the possibilities to economically melt good hot iron by combining the annular tuyere openings with the "center blast" simply by means of a high stack or chimney. This is simply an idea which the principle of the steam jet or free draft suggests to my mind, and I would not be at all surprised if in the near future the principles involved in the Herbertz cupola had so evolved as to make the principle of free draft prove far more economical and practical than the most sanguine might expect.

Some little discussion then ensued on the points raised by the papers, in which Messrs. Wood, Flagg, Schumann, Kelly, Gifford and others took part.

Mr. Gifford of the B. F. Sturtevant Company, Boston, Mass., upon request, consented to prepare a paper on the subject, "Pressure Blower and Fan: Which is the Most Economical?" to be read at a subsequent meeting of the association. The question, "What makes the best covering for a foundry? If tin, is there any special preparation known for painting it in order to preserve it?" coming up, many opinions were forthcoming. Mr. Flagg favored an asbestos roof and stated that the Berlin Bridge Company made a roof of that description, which he understood was largely used. Mr. Wanner also favored asbestos. Mr. Devlin thought slate was very satisfactory. Slag was also a good material, but was only adapted to a flat roof. He had found slate to give the best satisfaction. Mr. Messick considered slate the best material. His concern was putting on a new foundry roof at the present time and proposed to use copper flashings instead of tin. Gases from the molds destroyed tin. Mr. Ruhland and Mr. Wright also favored slate, while Mr. Rankin and Mr. Brown had found slag very satisfactory. Mr. Wright stated that he had found slate objectionable in one instance. This was on a roof where the bottom part of the rafters had been sheathed with 3 inch planks. Upon a necessary removal of the planks the pull of the foundry crane was such that it strained the roof, and many leaks appeared.

Mr. Wanner then offered the following resolution: "*Resolved*, That it is the sense of this association that the commodity rates maintained by the railway companies during the summer should be continued during the present season in view of the recent depression in business in order to accelerate its revival." After considerable discussion the matter was, on motion, referred to the Executive Committee.

## THE WEEK.

The Laclede Car Company, the St. Louis Car Company, the American Car Company, and the Brownell Car Company, all of St. Louis, and the St. Charles Car Company, of St. Charles, Mo., it is reported are soon to unite in a syndicate which will combine them practically into one concern, which will be the largest of its kind in the world. English capitalists are said to have arranged the deal.

The Prescott & Arizona Central Railway began a suit in the U. S. Circuit Court last week against the Atchison, Topeka & Santa Fé Railroad and the individual directors and officers of the subordinate companies, for \$8,250,000, for damages alleged to have been sustained by unjust discrimination.

The Naval Small Arms Board, which met at the torpedo station at Newport last week, received from six inventors ten mechanisms for test—namely, four from the Remington Arms Company, Ilion, N. Y.; two from the Hotchkiss Company, and one each from Mr. Miles of Aurora, Ill.; Mr. Van Patten of Troy, N. Y., and the Briggs-Kneeland and Russell Livermore guns. The tests are being carried on this week.

The Egyptian cotton crop is reported as being larger in volume than that of last year. This news, combined with large crop estimates in this country, has sent cotton down to the lowest price ever touched.

Experiments recently made at the laboratory of the Underwriters' Electrical Bureau in Chicago have demonstrated the destructive effect of electric currents on subterranean piping. Iron piping, through which the current was directed in this return, was badly pitted after being subjected to the treatment for the short space of 1333 hours.

The Municipal Council of the city of Paris have announced that they will receive, until November 1, detailed designs for smoke suppressing devices. They offer prizes of \$2000, \$1000 and \$400 for the three best suggestions.

In an open letter to the Scranton (Pa.) Board of Trade George M. Pullman denies that he will start a branch works in the East.

The Antwerp International Exposition was formally closed by the King of the Belgians on October 2, when the awards were distributed. American exhibits received 122 awards.

The statement of Canadian revenue and expenditure for the quarter ended September 30 shows a surplus of receipts of \$2,250,000 for the first three months of the fiscal year.

New York bankers still find great difficulty in profitably employing their loanable funds. The total reserve now held by them is more than \$200,000,000, or \$60,000,000 above the amount required by law against deposits.

A report of the Bureau of Navigation just issued shows that during the quarter ended September 30, 1894, there were built in the United States 84 steel, iron and wooden steam vessels, with a gross tonnage of 14,000 tons, against 105 similar vessels in the previous quarter, with a gross tonnage of 35,065 tons. During the same period 134 sailing vessels were constructed in American ports, with a total tonnage of 11,600 tons, against 199 sailing vessels and 13,400 tonnage in the previous quarter.

# The Iron Age

New York, Thursday, October 11, 1894.

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RICHARD R. WILLIAMS, - HARDWARE EDITOR.  
JOHN S. KING, - - BUSINESS MANAGER.

## Modern Blast Furnace Practice.

It is almost startling to think how short a time has elapsed since blast furnace practice has been completely revolutionized. The precision with which blast furnaces are now operated, so that the character of their product is unerringly predetermined, is an achievement of our own times. The manufacture of pig iron is a very old industry, and in view of what is now being done, together with its apparent absolute necessity, it is amazing that anything like satisfactory results should have been attained during the long years when iron makers were really groping in the dark. Yet in this age of progress we have grown so accustomed to the presentation of new ideas in all lines that we frequently fail to grasp the importance of some of the developments which are being made. This is the case with pig iron. It is only when some circumstance of the recent past is recalled that the very rapid strides made from empiricism to scientific exactness are realized.

This was peculiarly demonstrated at the recent meeting in Chicago of the Western Foundrymen's Association. Two men were present who had grown gray in the manufacture of pig iron. One, who is now a merchant, had gained distinction as a most successful manufacturer of charcoal pig iron in the Lake Superior region, in the days when charcoal iron was believed to possess special qualities unattainable with the use of coke, and consumers were willing to pay a high premium for it. The other had spent the greater part of his life, and is still engaged, in operating coke furnaces in Western Pennsylvania, and in his eminently successful career had welcomed and incorporated in his furnace practice the methods taught by scientific research. The former, alluding to the value of chemical investigation, related a most interesting experience in running a charcoal furnace only 12 or 13 years since, and said that at that time it was customary among charcoal furnacemen to have their pig iron analyzed about once in five years, but the services of a chemist were not considered necessary in determining what ores to buy or use. He learned the significance of silicon in pig iron from experience and not from theory, and attributed the reputation which his iron maintained for some years over that of his neighbors to his knowledge of the benefit derived from the mixing

of lean siliceous ores with the very rich Lake ores. The latter gentleman also dwelt upon the scientific side of the manufacture of iron and steel, told with what precision the operations of a furnace are now conducted under the all observant eyes of a chemist, and said that if a foundryman would tell him what kind of castings it was proposed to make he would guarantee to furnish the exact kind of iron needed to make them. Both agreed that the true way to buy pig iron is by analysis and not by fracture.

It may be said that this precision of method was introduced long since in the operation of blast furnaces run in connection with steel works. But when it is considered that the manufacture of Bessemer steel was only begun in this country in 1865, and was of very small proportions until between 1874 and 1880, the application of scientific methods in that direction is seen to have also been rather limited until a comparatively late date. The furnacemen making foundry iron were not only more conservative than those running on steel pig, but an incentive was lacking in the demand from their customers for iron of a certain grade instead of specific contents of metaloids. This conservatism has given way with the diffusion of scientific knowledge, and the more thorough technical education of those who engage in iron making. It is highly creditable to them that they have not been forced by their customers to revise their practice, but on the contrary have of their own volition made the changes which have brought about the new era. In fact, they find it necessary to conduct a campaign of education to awaken foundrymen to the importance of chemical analysis in determining the exact relative values of various brands of iron pressed upon them by salesmen. Having first established this important point, and created a demand for an iron of specific quality they stand ready to furnish precisely the same quality month in and month out.

This new condition of the foundry iron trade will bring about serious changes. In fact, it has already done so. Brands are of small consequence now, unless their chemical contents are of such a character as to give them special value for certain kinds of foundry work. There are some foundrymen who even go so far as not to accept furnace analyses, but make their own determinations when buying iron and satisfy themselves that they are getting just what they want. This is a very recent development in the foundry business and as yet is mainly confined to the largest establishments. Furnace analyses are usually taken. The malleable trade may be cited as a conspicuous example of the changes wrought by the new furnace practice. Whereas, up to two or three years since it was not considered feasible to use anything but charcoal iron in making malleable castings, to day the malleable works are largely using coke iron,

and it is asserted with fully as good results as when running on all charcoal, and at much lower cost. This has been brought about by the experiments of the coke iron makers in producing metal whose analysis is almost identical with that of the highest grades of charcoal iron. This would not have been possible under the old régime. Other developments in the foundry trade, of perhaps as great importance, are to be expected whenever the reformed method of selling by analysis and not by fracture shall have been established.

## An Important Strike Decision.

The famous anti-strike injunction of Judge Jenkins of Milwaukee has been ordered to be amended by the United States Court of Appeals sitting at Chicago. The injunction was issued to the employees of the Northern Pacific Railroad Company on the 19th of last December. The receivers of the road had given notice of a reduction of wages all along the line, and when the men threatened to strike Judge Jenkins issued the injunction preventing the strike. Two days later he amended the injunction, making it more stringent. The labor unions to which the men belonged applied to Judge Jenkins for a modification of the order. He refused to strike out the clauses enjoining a strike, and the labor unions appealed to the higher court. The matter was at the same time taken up by members of Congress closely identified with labor movements, and an effort was made to have Judge Jenkins impeached. The question thus attracted much more than ordinary interest, and the decision just rendered is regarded as a most important one in its bearing upon the labor question.

The decision was made by Justice Harlan of the Supreme Court, sitting in his capacity as presiding judge of the Court of Appeals. In it he makes rulings with regard to strikes which will be of weighty application hereafter, in the absence of direct legislation by Congress upon this vexatious subject. He says that the injunction against employees quitting so as to cripple the property or prevent or hinder the operation of the road was equivalent to a command of the court that they should remain in the active employment of the receivers and perform the service appropriate to their respective positions until they could quit without crippling the road. On this point the decision says:

If an employee quits without cause and in violation of an express contract to serve for a stated time, then his quitting would not be of right. But the vital question remains whether a court of equity will under any circumstances by injunction prevent one individual from quitting the personal service of another. An affirmative answer to this question is not, we think, justified by any authority to which our attention has been called, or of which we are aware. It would be an invasion of one's natural liberty to compel him to work for or remain in the personal service of another. One

who is placed in such restraint is in a condition of involuntary servitude—a condition which the supreme law of the land declares shall not exist anywhere within the jurisdiction of the United States.

The receivers, it is declared, had the right to make a new schedule of wages and offer it to the men with the alternative of accepting it or quitting the service, but on the other hand the men had the right to accept or refuse and to quit if they were not willing to work for less wages. In the decision a distinction is made between so quitting, "with or without notice, as to cripple the property or prevent or hinder the operation of the road" and "combining and conspiring to quit," which would mean that the dissatisfied employees and others co-operating with them would physically disable and render unfit for use the cars and other property in the hands of the receivers, and by force, threats and intimidation used against employees remaining in the service, and against those desiring to take the places of those quitting, would prevent the receivers from operating the road. The injunction against the former was not supported, but as against the latter was sustained. The position of Judge Jenkins on the general subject of strikes was not approved. Justice Harlan said he was not prepared to sustain the view that strikes are necessarily illegal or criminal. The case was remanded with the order that the injunction be amended in accordance with the opinion.

At the time the injunction was issued by Judge Jenkins the belief was very generally entertained, even by those not learned in the law, but who were employers, that it would not endure the test of severe analysis by a higher court. It involved such a new interpretation of the personal rights of employees, actually restraining them of their liberty as citizens, that the position taken was regarded as untenable. The relations of employers and employees are so peculiar in these days of great combinations of capital and powerful organizations of workmen that it is really a matter for congratulation that the Court of Appeals did not unqualifiedly sustain Judge Jenkins. Had this been the case, it would certainly have led to very radical legislation which might have been exceedingly unjust to employers.

### PERSONAL.

Perry Mackey has been appointed superintendent of the converting departments of the Edgar Thomson Steel Works, Bessemer, Pa., to succeed Wm. J. Miller, resigned. Wm. E. Rinard has been appointed to the place made vacant by the promotion of Mr. Mackey.

A. B. Courtney, mechanical engineer of the Buckeye Engine Company, Salem, Ohio, passed through Pittsburgh last week on his way to Japan, to which country he goes to put in place a number of engines which his firm are putting on three new Japanese torpedo boats.

Charles Lockhart of the Lockhart Iron & Steel Company, at Chartiers,

Pittsburgh, returned last week from a four months' visit to Europe.

S. T. Wellman and George W. Goetz arrived last week from their European trip.

Dr. Henry M. Howe of Boston, who attended the Brussels meeting of the Iron and Steel Institute, was one of a small party of Americans who were treated with the greatest consideration during a trip among the Westphalian steel works. R. M. Darlen and E. Schroedter of Duesseldorf were conspicuous in their efforts for the entertainment of the party, which included Frank S. Witherbee and Julian Kennedy.

Jacob James has resigned his position as superintendent of the New Philadelphia Iron & Steel Company, New Philadelphia, Ohio, and has been succeeded by S. T. Williams of Muscatine, Iowa.

E. H. Mumford, recently with Henry R. Worthington, has been appointed New York representative of the well-known firm of machine tool builders, Bement, Miles & Co. Mr. Mumford's headquarters will be in the Taylor Building, 39 Cortlandt street.

### San Francisco News.

SAN FRANCISCO, October 1, 1894.

The first rains of the season came on Saturday and were unusually heavy. This portends a generally good season as far as rainfall is concerned, and, were it an ordinary year, there would be much room for rejoicing. Of course a farmer, as long as he remains attached to his calling, would sooner see good crops than none, but, at the prices at which everything has been going, agriculturists have become somewhat indifferent. There was never a season in California like the present before. With a somewhat light crop prices began to go down, and, with few exceptions, they have remained in that condition ever since. When there would be a decline all would flatter themselves that this would be the last, and that surely prices never could go any lower, but no sooner had we recovered from our surprise at one drop in the market than another would come to amaze us still more, and now no one can be surprised at anything that may occur. This of course applies primarily to wheat and in a lessened degree to barley, but as wheat is, after all, our great staple it may be imagined in what a condition our farming population is, or rather in what a frame of mind the farmers are, with California wheat at 77½ to 80 cents per 100 pounds, and Oregon and Washington wheat at only 60 to 70 cents per 100 pounds in this market. These two States have not even the variety of cultivation that we have and their lumber business has been crippled by the tariff.

There is without doubt a better demand for hardware, steel, &c., than there was a year ago at this time, but low prices for wheat discourage every one, and the activity that has supervened temporarily on the passage of the Wilson bill cannot be expected to last, and but for the unprecedentedly heavy shipments of green fruit to the East matters in the country would be in a dull state indeed. Transportation matters are in fair shape, and the traffic association which did so much good last year is at work again after an interregnum of inaction. It is now supporting a road from San Francisco into the

San Joaquin Valley. This road it is thought will cost about \$6,000,000, and if it should be built there will be a lively competition between it and the Southern Pacific.

For a while past the importation by rail and sea has measurably ceased, but there are quite good stocks of hardware and iron, as well as steel, too, in the city. If there was anything like the old time demand from the various parts of the coast there would be but little cause to complain, but orders are not of large volume. Meanwhile the year is waning. There was a pretty fair demand for agricultural implements until a little while ago, but the season has passed away, and there will be little left to do in this department till after the opening up of next spring. There is, however, and has been a fair demand for builders' hardware, especially from the city retail houses and from contractors.

We are promised quite a reduction in the jobbing prices of tin plate for the ensuing week, as the price here has not yet responded to the reduction in duty, but no doubt will. The importation as yet has been rather light as compared with other years. The "Crown of Scotland" had September 13, 9485 boxes, making a total from January 1 of 118,305 boxes. This is rather small, more particularly as there has been a pretty fair pack of fruits, and as the pack of salmon will be doubtless as large as it was a year ago. But we carried over a large stock. The present jobbing price is \$5.40 per box. The price of pig tin was never lower than it now is—16½ cents. We continue to receive regular consignments of the Australian article by almost every steamer.

There is no special demand for pig iron in the open market, as most of those who thus were wont to buy now purchase in the East.

The outlook for machinery will, it is said, be likely to be impaired somewhat by the reductions in the tariff.

**Structural Tubing.**—The search for specialties to replace in manufacture staple goods, which have become unprofitable, is bringing about some interesting developments. Among the most recent is the production of what is called "structural tubing," developed by William C. Frick, the well known manager of the Mahoning Rolling Mill Company of Danville, Pa., makers of skelp iron. Mr. Frick, struck with the very large employment of welded tubes for all sorts of structural purposes and parts of machinery, reasoned that the requirement upon the material, so far as its welding quality is concerned, does not harmonize with the best specifications which would be called for from the standpoint of the strains to which it is subjected in these special services. In other words, a good tube for conveying liquids is not best adapted for resisting stresses. Besides, the cost of welding the pipe can be saved. These considerations led to the building of special machinery which bends strips of the exact character of metal desired into tubing, squares, channels and triangles, and it is this product which is now being successfully introduced for a wide variety of purposes. Contracts of magnitude have already been made with makers of agricultural implements and other specialties. Tests show the resistance of the new shape to tensile and bending stresses. We understand that an elaborate series is now being conducted, which will soon be in shape for presentation.



## A Slight Increase in Pig Production.

[[The indications are that the maximum of pig iron production has been reached for the present. The Western coke furnaces have settled down to work, and some of the effects of improvements and changes are noticeable in the increased production of individual stacks. There has been the expected addition to capacity in the South. On the other hand, the capacity of the anthracite furnaces has fallen off and may suffer a further decline as the winter advances. The frightfully low prices of charcoal pig iron are telling on the make in that department.]

On October 1 the active furnace plant, grouped according to fuel used, possessed the following weekly capacity:

Fuel.		
Anthracite.....	30	16,265
Coke.....	118	188,575
Charcoal.....	22	4,889

Totals October 1..... 172 159,729  
Totals September 1..... 171 151,113

Increase or decrease..... + 1 + 8,616

The weekly product of all the furnaces on October 1 compared as follows with that of preceding periods:

	Furnaces in blast.	Capacity per week. Gross tons.
October 1, 1894.....	172	159,729
September 1.....	171	151,113
August 1.....	185	115,356
July 1.....	107	85,950
June 1.....	88	62,517
May 1.....	127	110,210
April 1.....	144	126,732
March 1.....	138	110,166
February 1.....	125	99,242
January 1.....	130	99,087
December 1, 1893.....	130	99,379
November 1.....	117	80,070
October 1.....	114	73,895
September 1.....	125	83,434
August 1.....	169	107,042
July 1.....	220	153,762
June 1.....	244	174,029
May 1.....	251	181,551
April 1.....	255	178,858
March 1.....	255	176,378
February 1.....	251	171,201
January 1.....	246	173,083
December 1, 1892.....	246	176,271
November 1.....	244	171,082

The following charcoal furnace capacity was active on October 1:

Charcoal Furnaces, October 1, 1894.

Location of furnaces.	Total number of stacks.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New England.....	13	2	152	11	895
New York.....	5	1	105	4	440
Pennsylvania.....	13	1	42	12	870
Maryland.....	6	0	0	6	418
Virginia.....	13	0	0	13	827
Ohio.....	9	3	174	6	477
Kentucky.....	3	0	0	3	290
Tennessee.....	9	1	100	8	991
Georgia.....	3	1	286	2	230
Alabama.....	13	3	682	10	2,735
Michigan.....	20	6	1,898	14	3,970
Missouri.....	1	1	293	0	0
Wisconsin.....	5	2	1,052	3	830
Texas.....	4	1	125	3	470
Washington.....	1	0	0	1	100
Oregon.....	1	0	0	1	200
Totals.....	119	22	4,889	97	13,743

As compared with previous months the record of active charcoal furnaces stands as follows:

	Furnaces in blast.	Capacity per week.
October 1, 1894.....	22	4,889
September 1.....	23	5,099
August 1.....	20	3,463
July 1.....	22	3,806
June 1.....	18	3,274
May 1.....	17	4,023
April 1.....	18	3,932

March 1.....	18	3,754
February 1.....	18	3,645
January 1.....	21	4,099
December 1, 1893.....	26	4,950
November 1.....	28	5,084
October 1.....	28	5,496
September 1.....	28	5,700
August 1.....	34	5,583
July 1.....	35	7,224
June 1.....	34	8,034
May 1.....	38	8,595
April 1.....	38	8,729
March 1.....	36	8,623
February 1.....	37	8,934
January 1.....	38	8,885

There were few changes during the month. Bloom resumed and Olive in Ohio is idle.

The status of the coke furnaces was as follows:

Coke Furnaces, October 1, 1894.

Location of furnaces.	Total number of stacks.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New York.....	5	2	2,637	8	3,300
Pennsylvania:					
Pittsburgh District.....	26	25	39,153	1	1,245
Spiegel.....	1	1	915	0	0
Shenango Valley.....	17	13	12,327	4	2,599
Juniata and Conemaugh Valley.....	15	6	6,263	9	3,527
Spiegel.....	1	0	0	1	950
Youghiogheny Valley.....	3	1	900	2	1,405
Miscellaneous.....	4	1	5-3	3	1,000
Maryland.....	5	0	0	5	6,000
Wheeling District.....	8	6	6,381	2	2,400
Ohio:					
Mahoning Valley.....	14	9	10,285	5	3,700
Central and Northern.....	11	6	6,069	5	2,859
Hocking Valley.....	12	1	0	12	3,151
Hanging Rock.....	14	4	769	10	3,107
Indiana.....	2	0	0	2	412
Illinois.....	19	8	13,744	11	10,540
Minnesota.....	1	0	0	1	829
Wisconsin.....	5	1	1,140	4	2,938
Missouri.....	6	0	0	6	3,572
Colorado.....	3	2	1,991	1	600
The South:					
Virginia.....	22	10	5,966	12	7,385
Kentucky.....	6	2	712	4	3,118
Alabama.....	38	14	13,746	24	10,850
Tennessee.....	14	6	4,463	8	3,150
Georgia.....	2	1	585	1	600
N. Carolina.....	1	0	0	1	97
Totals.....	255	118	138,575	137	80,034

As compared with previous months the active coke furnaces make the following showing:

	Furnaces in blast.	Capacity per week.
October 1, 1894.....	118	138,575
September 1.....	112	125,879
August 1.....	79	94,707
July 1.....	53	64,878
June 1.....	40	47,104
May 1.....	75	88,580
April 1.....	92	105,011
March 1.....	83	89,794
February 1.....	80	81,970
January 1.....	80	81,997
December 1, 1893.....	72	78,241
November 1.....	57	58,820
October 1.....	52	53,061
September 1.....	54	56,976
August 1.....	84	77,907
July 1.....	122	117,072
June 1.....	140	132,079
May 1.....	146	139,788
April 1.....	145	135,488
March 1.....	145	133,579
February 1.....	140	129,396
January 1.....	138	131,751

Work was resumed in September by Little Giant in Pittsburgh, so that now there is only one furnace idle in that district, the Soho. There were also blown in during September Alice in the Shenango Valley, Martin's Ferry in the Wheeling district and Tropic in the Hanging Rock region. There were blown out or banked, Stewart in the Shenango Valley, Belfont in the Hanging Rock region and Glasgow in the Hocking Valley. In the South Virginia has added to its current capacity through the blowing in of one Longdale and of Low Moor. In Alabama Bloss

has started one while the Tennessee Company have now active four furnaces at Bessemer, three at Ensley, one at Cowan and one at South Pittsburgh.

The status of the anthracite furnaces was as follows:

Anthracite Furnaces, October 1, 1894.

Location of furnaces.	Total number of stacks.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New York.....	14	2	1,059	12	5,203
New Jersey.....	9	2	950	7	3,095
Spiegel.....	3	1	65	2	188
Pennsylvania:					
Lehigh Valley.....	39	9	4,069	30	11,413
Spiegel.....	1	0	0	1	65
Schuylkill Valley.....	27	5	2,793	22	9,646
U. Susquehanna Valley.....	15	2	1,400	13	4,511
L. Susquehanna Valley.....	15	3	2,200	12	4,325
Lebanon Valley.....	13	6	3,729	7	3,672
Totals.....	136	30	16,265	106	42,118

For a number of months past our records of active anthracite furnaces show the following:

	Furnaces in blast.	Capacity per week.
October 1, 1894.....	30	16,265
September 1.....	26	19,135
August 1.....	36	17,186
July 1.....	32	13,266
June 1.....	20	12,139
May 1.....	35	17,607
April 1.....	34	17,739
March 1.....	32	16,618
February 1.....	27	13,627
January 1.....	29	13,081
December 1, 1893.....	32	16,188
November 1.....	34	16,166
October 1.....	34	15,338
September 1.....	43	20,758
August 1.....	51	23,572
July 1.....	63	29,268
June 1.....	70	33,916
May 1.....	67	33,168
April 1.....	72	34,641
March 1.....	74	34,773
February 1.....	74	32,871
January 1.....	70	32,772

Work was stopped during September at the Passaic Spiegel furnace, which since has made an effort at resumption; at one Bethlehem, and one Hokendauqua in the Lehigh Valley, one Lackawanna and Juniata in the Upper Susquehanna region, and one Lackawanna in Lebanon Valley. The only furnace which started in September was one Crane in the Lehigh Valley.

### Stocks.

The position of stocks, sold and unsold, as reported to us October 1, was as follows, the same furnaces being represented as in former months:

	August 1.	Sept. 1.	Oct. 1.
Stocks.	Tons.	Tons.	Tons.
Anthracite pig.....	123,913	116,833	105,287
Coke pig.....	223,902	197,877	185,427
Charcoal pig.....	220,033	217,554	221,998
Totals.....	567,848	532,264	515,712

It must be remembered, as we have frequently stated in connection with these reports of stocks, that they do not include the quantities held by the large steel companies East and West.

As indicating the extremely low prices competition has brought about the Boiler Maker reports a bid having been made of less than 2½ cents per pound on riveted work of several hundred tons ½" plate.

Chief Constructor Hichborn of the Navy Department, after a thorough inspection, has reported the new cruiser "Minneapolis" ready for commission. As the last Congress failed to make an appropriation for her crew the cruiser will, however, probably remain at Cramps' shipyard for some time.

## MANUFACTURING.

### Iron and Steel.

Fulton Furnace of the Globe Iron Company, at Jackson, Ohio, has resumed operations after a long idleness. The furnace has a capacity of about 25 tons of high silicon softeners per day.

Two more sheet mills were put in operation at the plant of the Whitaker Iron Works, Wheeling, W. Va., last week. The large engine has been practically rebuilt and is furnishing the power for mills Nos. 1 and 2. Mills Nos. 6 and 7 of this plant have been running for some time.

All departments of the plant of the American Tube & Iron Company, Youngstown, Ohio, manufacturers of wrought iron pipes and tubes, are in operation to full capacity.

The Oxford Iron & Nail Company of Oxford, N. J., are enlarging their plant and making a number of important improvements. They have awarded a contract to the S. R. Smythe Company of Pittsburgh for the erection of a 16 x 7 foot heating furnace, which will increase the present capacity 30 tons per day.

The New Albany Rail Mill will very probably resume operations within the next few months. The creditors met on September 25 to consider the matter, about 80 per cent. of them being represented. A proposition was made to the creditors to allow their claims to be paid with stock in a new company or else to accept whatever pro rata the assignee may be able to pay from the assets in the usual way. Nearly all the creditors were in favor of having their claims paid with stock of a new company, and a committee of three, of which Daniel Prosser was made chairman, was appointed to engineer the deal. The committee will also decide whether the plant shall be located in New Albany or Alexandria, Ind. When the assignment was made the company were moving their machinery to Alexandria, and at present two-thirds is at that place. It is said that most of those concerned prefer to have the mill at New Albany, and should such a conclusion be reached the machinery would be returned from Alexandria.

The Atlanta Steel & Tin Plate Company are making rapid progress in the erection of their works. The contract for mills is in the hands of the Lewis Foundry & Machine Company, Pittsburgh. The foundations for the rolls and engine are partially completed. The engine is a Woodruff & Beach automatic cut off, 36-inch diameter cylinder and 72-inch stroke, to be geared direct to the mills. The buildings are to be all iron and brick. The company have 2000 acres of gas territory in the Ellwood district and are in the market for 4 miles of pipe for their gas line.

The Crescent Sheet & Tin Plate Company, Cleveland, Ohio, have been granted a charter of incorporation, with a capital stock of \$200,000. The new concern have been organized for the purpose of manufacturing, selling and dealing in sheet iron and tin plate of every description.

The Duquesne Tin Plate Company of Pittsburgh, manufacturers of tin andterne plate, whose works are located at Soho, are considering the advisability of removing their plant to New Kensington, Pa., some 20 miles from Pittsburgh on the line of the Allegheny Valley Railway. In case the removal is decided upon it is the intention to erect a black plate mill for rolling down sheets from bars. As yet no decision has been arrived at in the matter, and it will probably remain undecided until the present wage troubles surrounding the tin plate industry have been removed.

The entire plant of the Ellwood Tin Plate Company, Ellwood City, Pa., is closed down pending adjustment of the wage scale.

Work is progressing rapidly on the new blast furnace now under erection by the Bellaire Nail Works, Bellaire, Ohio, contract for which was secured by McClure & Amsler, engineers and contractors, Bissell Block, Pittsburgh, Pa. This new blast furnace will be most complete in its equipment and will have a capacity of about 250 tons of iron per day, and is expected to be ready for blast not later than January 1, 1895. In connection with the present stack of the Bellaire Nail Works, it is expected that this firm will be able to turn out sufficient Bessemer iron to meet the converting capacity of their steel plant.

Some extensive improvements in Open Hearth Department No. 1 of the Homestead Steel Works, Homestead, Pa., are contemplated. The plans for the remodeling of this department are about ready, and as soon as orders now on hand are completed the work of reconstructing the plant will be commenced. New cranes will be put in, which will be operated by electricity instead of hydraulic pressure, as at present. An electric charging machine will be one of the features which is expected to be an improvement over the charger in Open Hearth plant No. 2, the latter being operated by steam furnished from a boiler heated with oil. This is the machine for which the firm have offered a prize of \$100 for the best plan submitted to them by October 10. It is also proposed to castinggots on buggies instead of in pits, as is the present practice. The 119-inch mill is expected to be closed down about the same time as Open Hearth No. 1, and will also be overhauled and improved and many electric appliances introduced.

The annual meeting of the stockholders of the Pennsylvania Steel Company, Steelton, Pa., was held in Philadelphia on Wednesday, the 3d inst. The report of the receivers of the operations for the year ending August 31 showed net profits of about \$150,000, the business being greatly interfered with by the Chicago strike as well as by the financial embarrassment of the country. The Reorganization Committee states that nearly all the stockholders have participated in the reorganization scheme, and the subscriptions to the preferred stock footed up \$1,751,000, or \$251,000 in excess of the amount requested. The stockholders by a vote of 30,745 shares elected this Reorganization Committee to serve as directors, as follows: Effingham B. Morris, John B. Gest, N. Parker Shortridge, George Philler, Howland Davis, Alfred Earnshaw, Luther S. Bent.

At the Homestead Steel Works, Homestead, Pa., the office of assistant superintendent has been abolished and that of night manager created.

The puddlers in the employ of the Oliver Iron & Steel Company, at Pittsburgh, are still on strike against a reduction in the price of boiling of from \$4 to \$3.60 per ton. Some four or five furnaces are being operated single turn and others will be started up as soon as additional men have been secured.

The Penn Iron Company, Ltd., Lancaster, Pa., have notified their puddlers of a reduction in wages from \$3 to \$2.75 per ton. Other employees have been reduced about 8 per cent.

No. 11 furnace of the open hearth department of the Pennsylvania Steel Company, Steelton, Pa., has been fired for the first time. It has a capacity of 50 tons. No. 12 furnace, of like capacity, is being pushed to completion.

The furnace of the Temple Iron Company, at Temple, Pa., has resumed blast. It blew out during the strike in the soft coal region.

Belfont Furnace, at Ironton, Ohio, which has been idle for the past three weeks undergoing repairs, expected to resume blast on the 10th inst.

The Maumee Rolling Mill property, at Toledo, Ohio, has been sold at sheriff's sale to Alvin Peter, trustee, for \$43,335, or two-thirds of its appraised value. Additional real estate, also bought in by Mr. Peter, brought the entire receipts of the sale to \$84,670.

The blast furnace plant of the Onondaga Iron Company, at Geddes, N. Y., has been purchased by the Solvay Process Company of Syracuse, N. Y. We are advised by the company that they do not propose to go into the manufacture of pig iron, neither will they erect a foundry, as stated in the published reports. They will utilize the furnaces, which have been idle for a long time, for their own special purposes.

Last week's output of the Pennsylvania Steel Works, Steelton, was the largest of the year, and the various departments of the works are reported as being crowded with orders.

The Parkesburg Iron Company, Parkesburg, Pa., have given notice of a reduction in wages of 10 per cent. It will probably be accepted.

The addition to the works of the American Tin Plate Company, at Ellwood, Ind., is now completed and in operation. We understand that the employees have been informed that there will be no reduction in wages.

Edgar Watts of the Watts Iron & Steel Syndicate, Middlesborough, Ky., is credited with saying that his company propose to begin operations on part of the plant within 30 days.

One of the sheet mills at Canal Dover, Ohio, has been converted into a tin mill, and it is reported that a six-mill plant will soon follow.

Press dispatches announce the partial destruction by fire of the Tudor Iron Works, at East St. Louis, Ill., on Tuesday last. The loss on machinery is estimated to have been \$50,000, and the loss on building \$10,000. The works produce railroad splices, T-rails, bar iron, bolts and spikes, and have a rated capacity of 55,000 gross tons per annum.

### Machinery.

The plant of the Ellwood Shafting & Tube Company, Ellwood City, Pa., has changed hands, and has become the property of a number of capitalists headed by H. A. Lozier, Cleveland, Ohio. A new Board of Directors have been elected, and they have organized by electing F. W. Ensworth of New York City president, H. W. Hartman vice-president, and H. A. Baull treasurer. Some important improvements to the plant are contemplated, and 15 new bicycle tubing machines will be added at an early date. I. C. Roberts, who it is claimed made the first cold rolled seamless tubing made in this country, will be superintendent of the plant, and F. W. Ensworth will be general manager.

The Hawley Down Draft Furnace Company of Detroit, Mich., have recently placed W. H. Dennison in charge of their office in the Lewis Block, Pittsburgh, and the following orders have been secured: One Hawley down draft furnace of 100 horse-power for the Pittsburgh Central High School Building; four furnaces for the new Carnegie Building, to be attached to three Heine and one Babcock & Wilcox boiler of 750 horse-power; also a 400 horse-power furnace for the Imperial Power Building, now being erected by J. J. Vandergrift on Penn avenue, Pittsburgh, Pa.

G. A. Crosby & Co., 176 and 178 South Clinton street, Chicago, have just shipped a considerable lot of machinery to Australia, and are now getting another shipment ready to go to New Zealand. Their general business in the manufacture of presses, dies and special sheet metal machinery is very good at present.

A plant for the manufacture of wood working machinery is to be established at Green Bay, Wis., by Richards & Hendly, formerly manager and superintendent of the Berlin Machine Works, at Beloit. The plant will comprise a machine shop and foundry. Three acres of land and the necessary buildings have been donated for the purpose by the Business Association of Green Bay. The original Berlin Machine Works continue in operation at Beloit.

Wilcox, Crittenden & Co., Middletown, Conn., well known as manufacturers of ship chandlery hardware, announce that their Mill Hollow Foundry is prepared to turn out iron castings of all kinds. This concern, it is stated, is one of the few in the country equipped to make the castings, tin or galvanize them, and do all kinds of machine work in one establishment.

The Benton Harbor Iron Works have been organized at Benton Harbor, Mich., with a capital stock of \$100,000, and will utilize the old Courtright plant. Additional equipment will be added with the intention of having a first-class machine shop and iron and brass foundry. The company consist of practical mechanics with whom men of capital are also associated. They will manufacture the Woods sand brick machine for making brick of sand and cement, on which there is already an established trade. They will also undertake special work in the iron and brass line.

The Totten & Hogg Iron and Steel Foundry Company, Pittsburgh, Pa., manufacturers of rolling mill and tin plate machinery and rolling mill engines, have just received an order from the American Tin Plate Company of Ellwood, Ind., for a train of 20-inch cold rolls, all complete with rolls.

The Adams Boiler Company of Cleveland, Ohio, have received an order for a 500 horse-power waste heat boiler from the Falcon Iron & Nail Company, Niles, Ohio.

The Edward P. Allis Company, Milwaukee, Wis., have been awarded the contract for two pumps by the city of Pittsburgh. The price is \$169,000, and the pumps are to

he completed in from seven to ten months from date, and will have a capacity of 12,000,000 gallons per day.

The Warren Boiler Works, Warren, Ohio, have the contract for part of the iron work for the repairs now being made to the blast furnace of the Andrews & Hitchcock Iron Company, at Youngstown, Ohio.

The Westinghouse Air Brake Company of Pittsburgh, with works at Wilmerding, Pa., are in receipt of a number of large orders for air brakes and have recently made a large shipment to San Francisco.

We are advised that the statement that Wm. Yagle & Co., Limited, proprietors of the Lawrence Foundry, at Pittsburgh, would erect a corrugated iron building to be used as a general machine shop is untrue. No extensions to equipment are contemplated by the above firm at this time.

Bids were opened at the Navy Department on October 2 for furnishing the Washington Navy Yard, for use in the gun carriage shop, with one electric traveling crane having a lifting capacity of 25 tons and one having a capacity of 10 tons. Following are the competing concerns, with their bids: Yale & Towne Mfg. Company, Stamford, Conn., \$11,584; Morgan Engineering Company, Alliance, Ohio, \$9572; Manning, Maxwell & Moore, New York, \$10,985, and the Industrial Works, Bay City, Mich., \$20,300. Only two concerns entered bids for furnishing the supports and runways, estimated weight 228,000 pounds, viz.: Morgan Engineering Company, \$8745, and S. C. Forsaith Machine Company, Manchester, N. H., \$9514.44.

W. D. Moore & Bros.' foundry, at Wellington, Kan., is to be removed to Wichita and consolidated with the Stewart Iron Works. The former concern now become sole owners of the entire business, which is that of manufacturing stoves and general castings.

The foundry of J. H. Johnson & Co., at Manchester, Va., has been destroyed by fire together with machinery and patterns. The loss is placed at \$100,000.

The Elwood Steam Forge Works, at Elwood, Ind., are now completed and in operation.

The Chapman Valve Company of Indian Orchard, Mass., are building an addition to their foundry, making the latter 185 x 120 feet in size. It is stated that about \$25,000 will be spent on building and new machinery.

The blacksmith shop and warehouse of the Industrial Iron Works, Cheboygan, Mich., have been burned.

The Stokes Boiler & Sheet Iron Mfg. Company of New Orleans, La., have been incorporated. Alphonse Marx is president.

The Lennox Machine Company's plant, at Marshalltown, Iowa, has been burned, entailing a loss of \$10,000.

The Ferracute Machine Company of Bridgeton, N. J., have just completed and shipped to the Frankford Arsenal, Bridgeburg, Philadelphia, a very handsome drawing press with double automatic feed rolls, scrap clipper and arranged with double dies for producing the shells for cartridges. This press is from their new designs and embodies the latest inventions in the way of automatic feeds, &c. It will cut and form 160 shells per minute. The company are now quite busy, with orders in for four or five weeks ahead. They have recently shipped a heavy embossing press to England, several punching and cutting presses to various factories in this country, and are getting up some small presses with dial feeds for making a new style of metal rim for tags for a New York firm. They are also building some large double column presses, one for structural iron work and the other for electrical work, and a large drawing press for oil stove work.

#### Hardware.

The Speeder Cycle Company, New Castle, Ind., are a recent corporation organized for the manufacture of a patent bicycle. They have commenced the erection of a plant and have just contracted with the Lodge & Davis Machine Tool Company of Cincinnati, Ohio, for their entire equipment, including engine lathes, turret lathes, screw machines, milling machines, grinding machinery, &c. Additional machinery has also been purchased from Chicago and Indianapolis concerns. The new plant will, we are advised, be very complete and will be in operation, it is hoped, by December 1.

The Cleveland Twist Drill Company, Cleveland, Ohio, refer to business as steadily improving. They have been running for some time their full complement of men ten hours a day.

Backus Mfg. Company, Williamsport, Pa., manufacturers of portable steam radiators, mantels, &c., advise us that they are desirous of disposing of the tools, machinery and patents of the Backus bit braces. These braces were formerly made by Q. S. Backus, at Winchendon, Mass., but are not at the present time being manufactured, Mr. Backus devoting his whole attention to the products of the Backus Mfg. Company, of which he is general manager.

The polishers at the American Axe & Tool Company's plant, at Ballston, N. Y., have received notice of a reduction in wages varying from 10 to 25 per cent.

The Whitman & Barnes Mfg. Company, Akron, Ohio, have made a slight reduction in the wages of their employees, which has been accepted. The officers of the company state that such action was necessary on account of the low rate at which contracts have to be made under the new tariff law.

The Moore Mfg. Company, Milwaukee, Wis., will in a few days remove their entire plant to South Milwaukee, where they will operate on a much larger scale.

A certificate of organization has been granted to the H. Davidson Company of Naugatuck, Conn. The company have been organized to manufacture articles of brass, iron, &c. The capital stock is \$30,000. The subscribers are H. Davidson, A. G. Clapp, H. Twitchell, and others.

A new file works is to be built by H. Mayer & Co., proprietors of the Gold Medal File Company of Philadelphia. The new plant will be located at the corner of Twentieth street and Allegheny avenue. The structure will be of brick, two stories high, 30 feet front and 150 feet deep, with boiler house 40 x 20 feet on lot 61 x 225 feet. The cost is estimated at \$10,000.

The 80 men who struck at the National Bolt & Nut Works, Reading, Pa., against a 10 and 20 per cent. reduction, have agreed to accept a reduction equal to 5 and 10 per cent. and have returned to work.

The iron axle plant of J. R. Johnson & Co., Manchester, Va., was destroyed by fire on the morning of the 5th inst. Loss, \$10,000; insurance, \$20,000. The firm will probably rebuild.

The Covington Brass Mfg. Company, Covington, Ky., have sold out to the Barney & Smith Car Mfg. Company of Dayton, Ohio.

The Page Combined Rail Brass, Nut Lock & Tie Plate Company, Meridian, Miss., have been incorporated by C. W. Page and others. The capital stock is \$100,000.

The Cincinnati Barb Wire Fence Company, Cincinnati, Ohio, are working on full time with a force of 450 men.

The Hughes Fare Register Company, Brooklyn, N. Y., have been incorporated. Andrew H. Hogg, Jno. G. Lyon and Harry F. Hughes are the incorporators. The capital stock is \$10,000.

The Metal Turning Company, New Haven, Conn., have been absorbed by the Torrington Mfg. Company, Torrington, Conn., and the business is now being removed to Torrington. The manufacture of bicycle specialties in metal, and a special turret lathe will be continued at the latter place.

Buckeye Mfg. Company, Union City, Ind., announce that their works will be shut down from about October 10 to October 20, during which time they will move into their new plant at Anderson, Ind. When located in their new quarters the company state that they will have 100,000 square feet of floor surface and will be better equipped than ever to take care of their increasing trade.

H. B. Black & Co., Chester, Pa., report quite an improvement in orders for their Wm. Beatty & Sons' edge tools, in number as well as in size, so much so that they have increased the number of their working days.

At Freeport, Ill., on the 29th ult. the Union Mfg. & Plating Company's plant was burned, entailing a loss of \$12,000, with \$10,000 insurance.

The Illinois Screw Company, now located at 50 South Canal street, Chicago, have closed a contract with the Chicago Heights Land Association whereby they will remove their manufacturing business

to Chicago Heights. The building will be of brick and stone, 75 x 175, with boiler and engine house attached, and will be located on the tracks of the Chicago Heights Terminal Railway Company.

The Standard Harrow Company have purchased of D. C. & H. C. Reed & Co., Kalamazoo, Mich., their harrow business and now control the three large harrow factories in the city. Kalamazoo is to be the point of manufacture and shipment for the West as Utica, N. Y., is for the East.

#### Miscellaneous.

The Allegheny Heating Company, Allegheny, Pa., suppliers of natural gas, have elected directors as follows: George Westinghouse, Jr., J. R. McGinley, John Caldwell, Robert Pitcairn, Calvin Wells, A. Groetzing, William F. Lloyd, Herbert Dupuy, R. S. Smith, James T. Arnold and James McCutcheon.

The Champion Iron Company of Kenton, Ohio, have secured a \$14,000 contract for the erection of a new jail at Waukegan, Ill. It will have cells for 75 prisoners, built according to the special designs of the company.

The Union Switch & Signal Company of Pittsburgh, Pa., have just put in an interlocking switch and signal plant at Laughlin Junction on the Baltimore & Ohio Railroad, 3 miles from Pittsburgh. There are 22 levers, operating 20 switches and 20 signals and one set of movable crossing frogs. The switches are 15 regular and five derailling switches. The switch connections are all made with 1-inch gas pipe, while the signal connections are made with wire of about 3-16 inch in diameter. The Board of Directors of the Union Switch & Signal Company have declared a quarterly dividend of 1½ per cent. on the preferred stock of the company, payable by check on the 15th.

Arrangements are reported to have been completed for the erection of large shops at Dunkirk, Ind., by the Dunkirk Locomotive Works. If the plans published are executed the plant will be a large one, no less than 12 buildings being contemplated.

The strike at the National Bolt & Nut Works, Reading, Pa., has been compromised by the 80 employees who were on strike agreeing to accept 10 per cent. reduction in place of 20 per cent., as at first proposed.

The wire factory erected about two years ago at Dolgeville, N. Y., by Rudolph Giese of Germany is shortly to be started up. At first piano wire only will be manufactured, but it is the intention to turn out all kinds of wire in the near future.

A charter of incorporation has been issued to the American Smelting Company of Wheeling, W. Va., with an authorized capital of \$1,000,000. The incorporators are: John A. Campbell, Charles Menkemeller and Thomas H. B. Haas of Wheeling, Robert C. Haas of Bellaire, Ohio, and Joseph B. Hall of Wheeling. It is announced that it is the intention of this concern to manufacture aluminum after a process discovered by Mr. Hall. In addition to smelting the aluminum a rolling mill is contemplated for the purpose of rolling aluminum into sheets and bars.

The Johnson Company have ordered a 10,000 horse power engine for driving the blooming mill of their new Lorain plant from Galloway in Scotland. The same firm built the engine which drives the rail train at the Johnstown plant of the company.

The Deering Harvester Company, one of the heaviest customers of the United States Cordage Company, having a long unsettled difficulty with the trust, have decided to put up a mill for the manufacture of binding twine, which will make them not only independent, but active rivals of the trust. The Deering mill will, it is announced, have a capacity of 12,000 tons of twine a day, or about one fifth of the annual consumption.

A Bremerhaven firm have commenced a five masted sailing ship of iron, which will be 365 feet long, 50 feet beam, and 81½ feet deep, her gross tonnage being 4280 tons.

# The Iron and Metal Trades.

Reports are somewhat conflicting, although the weight of evidence is against an encouraging view of the situation. One aggressive district or individual concern may relapse into temporary repose as a contestant for work, but others rush into the fray with renewed desperation. Their attitude for the time being tinges the reports of localities or individual authorities. Although some of the greatest concerns in the country are reported to be very busy, proofs that they want more keep cropping up.

There is a decidedly weakening tendency in Soft Steel and in Bessemer Pig, a turn in affairs which is quite welcome to the rolling mills which buy in the open market and must meet the lowest prices on record thus far for Finished Material.

Sellers are eagerly canvassing the market, but buyers still expect prices lower than \$15.75 @ \$16, Pittsburgh, which they are now quoted. Business has been on a moderate scale. A characteristic sale reported is that of 2000 tons of Soft Steel, delivered at Harrisburg by a Pittsburgh concern under the shadow of a great Steel plant.

It may be interesting to note reports current that some time since Chicago Steel was sold to go to New England.

A Girder Rail mill in Western Pennsylvania placed a part of its order with an adjoining Steel works. Another works making the same line of goods are in the market for 10,000 tons of Blooms. Gossip has it that a great Pittsburgh concern is soon to appear as a competitor in the Girder Rail trade.

In standard Rails the outlook in the West is pronounced better. Pittsburgh has taken an order for 10,000 tons, one-half thereof to be delivered next year, while another Western mill has closed for 5000 tons, early delivery. It seems certain that very heavy renewals will be necessary next year, and the tonnage will be large if the financial arrangements can be made. The Pittsburgh "canard" that the pool will be renewed is premature, since no meeting has been held thus far.

Quite a good deal of Bridge work is coming up. Comment has been excited in the case of specifications calling for about 1000 tons of Bridge work which call for Iron instead of Steel.

A fair run of big orders for Structural Material has come out in New York and Boston. For the first time for many months an Eastern mill has captured a good many orders. Since the concern in question is completing a large new Beam train, reported to be the equal of any in the country, interesting developments may be expected. The low prices must ultimately bring out a tremendous expansion in the demand for Beams.

A meeting of the Western Bar Iron makers has been held. A further conference takes place at an early date.

In Foundry Irons there is a weakening tendency. After a number of false starts, another attempt to advance rates of freight from Southern furnaces is talked of. This cry of "wolf" is growing monotonous.

Charcoal Pig has sold under \$13 in Detroit lately.

The feature of the week in the Metal trade has been the slump in Tin. The Tin Plate mills are still closed. Public sympathy is not altogether with the manufacturers.

## Chicago.

(By Telegraph.)

Office of *The Iron Age*, 59 Dearborn street, CHICAGO, October 10, 1894.

The Iron trade is again drifting into a condition in which people talk much of possibilities for business. A great deal is heard of a character to support the impression that at some time in the early future business must be large. Considerable stress is placed on the railroad situation. During the past few weeks the shortage of cars has become very noticeable. This is due partly to increased business, but more to the crippled condition of rolling stock. It is believed that large purchases of cars must be made at some time in the near future and repairs of an extensive character must also be made to tracks. If railroads can borrow money, and it is believed they will be able to do so this winter, a great deal of work must come from them, and this will stimulate other classes of trade.

**Pig Iron.**—The market for local Irons holds up remarkably well, as by this time it had been expected that trade would fall off. Among the sales of the past week was one of 2000 tons, which shows that all the large buyers have not yet covered their requirements into the future. The prospect for the foundry trade appears to be growing brighter. More foundries are being employed and they are increasing their consumption of Iron. Inquiries are consequently growing for Pig Iron rather than diminishing. The agents of Southern furnaces feel the improvement in inquiry, but so far have not been able to secure very much of the business thus promised. Their prices are still too far above those of local Iron. Some cutting is reported in Southern brands, but the leading companies insist that they are holding firmly to quoted prices. Lake Superior Charcoal has at length given way under pressure of some of the leading sellers and quotations are now openly made of \$13 by makers themselves. A 500 ton lot is reported to have been sold at Detroit under even this price. Quotations are given as follows for cash.

Lake Superior Charcoal.....	\$13.00 @	\$15.00
Local Coke Foundry, No. 1....	10.25 @	11.00
Local Coke Foundry, No. 2....	10.00 @	10.25
Local Coke Foundry, No. 3....	9.50 @	10.10
Local Scotch.....	10.25 @	11.00
Ohio Strong Softeners No. 1....	13.00 @	13.50
Southern Silvery, No. 1.....	..... @	.....
Southern Silvery, No. 2.....	..... @	.....
Southern Coke, No. 2.....	10.75 @	11.25
Southern Coke, No. 3.....	10.50 @	10.75
Southern, No. 1, Soft.....	10.75 @	11.25
Southern, No. 2, Soft.....	10.50 @	10.75
Alabama Car Wheel.....	17.50 @	18.00
Jackson County Silvery.....	15.50 @	16.00
Other Ohio Silvery.....	14.25 @	14.50
Coke Bessemer.....	11.25 @	11.50
Coke Malleable.....	10.5 @	11.25
Spiegel Eisen 20%.....	..... @	26.00

**Bars**—Plenty of small orders are in the market and a few straggling season contracts are now coming up. Business in Car Iron is not developing as had been expected. One or two sales of this class of Iron were made during the week at prices so low that some hitherto cheap sellers found themselves completely out of the race. More Car Iron seems to be selling in other parts of the State than in this immediate vicinity. The meeting of the Bar Iron manufacturers held at Indianapolis last Tuesday was fairly attended, but no action was taken of a definite character. The meeting adjourned to meet in Cleveland on the 23d, when an effort will be made to secure representation from all the Bar makers west of the Alleghany Mountains. Prices on ordinary lots are still quoted at 1¢ @ 1.05¢, Chicago, for mill shipments of Com-

mon Iron from Old Rail mixture, which are being shaded for desirable specifications. Guaranteed Iron appears to be in considerably better shape, and sales are being made at 1.15¢ @ 1.20¢ with comparative ease, when the condition of Common Iron is considered. Soft Steel Bars from strictly Billet stock are selling at 1.20¢ @ 1.25¢, Chicago, for mill shipments of ordinary quantities. The demand for small lots from stock is fair at 1.25¢ upward for Iron, and 1.35¢ upward for Soft Steel.

**Structural Material.**—Considerable business is still coming forward in the bridge line. Nothing new is reported in the building line, but the approach of winter causes deliveries to be hurried. Quotations for mill shipments, Chicago delivery, are as follows: Beams and Channels, 1.50¢; Angles, 1.40¢ @ 1.45¢; Tees, 1.65¢; Universal Plates, 1.40¢ @ 1.45¢. Small lots of Beams and Channels from stock, 1.75¢ @ 1.90¢; Angles, 1.50¢ @ 1.60¢; Tees, 1.70¢ @ 1.80¢.

**Plates.**—Bridge work is taking a great deal of material in this line, and reports of improvement in the Boiler trade are coming in from the city and from a large part of the country. The demand has, therefore, been considerably better of late, both for mill shipments and from store. Mill shipments, Chicago delivery, are quoted as follows: Tank Steel, 1.40¢ @ 1.50¢; Flange Steel, 1.65¢ @ 2.10¢; Fire Box, 1.65¢ @ 5¢. Store prices are as follows: Iron or Steel Sheets, Nos. 10 to 14, 1.70¢ @ 1.80¢; Tank Steel, 1.50¢ @ 1.65¢; Flange Steel, 2¢ @ 2.15¢; Boiler Tubes, in carloads, 75 % off.

**Sheets.**—Consumers are having as much difficulty as ever in receiving shipments on contracts. Quite a number of mills have either shut down or expect to be closed on account of the wages dispute in the Tin Plate mills, which is having its effect on the merchant mills. The mills which are running are offered much business from consumers disappointed by other concerns and orders are being turned away that would have been eagerly taken only a few weeks since. Galvanized Sheet Iron is in about the same condition as Black Sheets. Mill shipments of No. 27 Common Iron are nevertheless still quoted 2 35¢ @ 2 40¢, Chicago; Steel Sheets, 2.50¢, and Galvanized Sheets, 75 and 10 and 5 % off. Sheet Copper, 14¢ base in large lots. Small lots of No. 27 Common Black Sheets from stock are quoted at 2 45¢ @ 2 50¢; Galvanized Sheets at 75 and 5 % @ 75 and 10 %.

**Merchant Steel.**—The trade of the past week was not up to that of the previous week. Mill shipments, Chicago delivery, are quoted as follows: Smooth Finished Machinery Steel, 1 50¢ @ 1.60¢; Smooth Finished Tire, 1.50¢ @ 1.60¢; Open Hearth Spring Steel, 1.75¢ @ 1.80¢; Bessemer Machinery, 1.40¢ @ 1.45¢; Bessemer Tire, 1.40¢ @ 1.45¢; Ordinary Tool Steel, 5 1/2¢ @ 7¢; Specials, 10 1/2¢ and upward.

**Billets and Rods.**—The Billet trade is fair, with prices continued at \$17.75 @ \$18. The Joliet Rod mill is now practically sold up to the end of the year. Prices on Rods are continued at \$24 50 @ \$25.

**Rails and Track Supplies.**—The situation has decidedly improved in respect to tonnage. Orders are of course for small lots, but there are plenty of them and inquiries are coming in for considerably more. The trade is stated



to be fully as large as usual at this time of the year and prospects are good for the continued operation of the local mill until well into the winter. Quotations are continued as follows: Standard Rails, \$25 @ \$27; Steel Splice Bars, 1.25¢ @ 1.35¢; Track Bolts, with Nuts, 2.10¢ @ 2.20¢; Spikes, 1.65¢ @ 1.75¢; Links and Pins, 1.65¢ @ 1.70¢.

**Old Rails and Car Wheels.**—The railroads are again inclined to part with their stocks of Old Iron Rails and sales have been made at \$11, Chicago, which price now seems to be well established. Old Steel Rails are quoted at \$7.50 for short pieces and \$10 @ \$11 for long lengths. Some transactions have taken place in Old Car Wheels at \$10.

**Scrap.**—Heavy sales have been made of Old Material from the World's Fair by the Columbian Exposition Salvage Company. The transactions of the past week aggregated about 4000 tons of all kinds of Scrap Iron and Steel. City dealers are soliciting business more actively. Dealers quote the following selling prices per net ton: Railroad Forge, \$9; Dealers' Forge, \$8.50 @ \$9; No. 1 Mill, \$7.50; Pipes and Flues, \$6.50; Axles, \$13.50 @ \$13.75; Heavy Cast, \$7 @ \$7.50; Stove Plates, \$5 @ \$5.50; Cast Borings, \$3.50; Wrought Turnings, \$5.25; Axle Turnings, \$6.50; Fish Plates, \$10.50; Horseshoes, \$9; Mixed Steel, gross ton, \$5.50; Heavy Melting Steel Scrap, \$7 @ \$7.50.

**Metals.**—Lake Copper continues to advance, and is now quoted at 10¢ for carload lots. Only small lots of casting Copper are now moving, on which 9½¢ is asked. Spelter is quiet and quoted at 3.27½¢. Pig Lead is down to 2.97½¢ for October and 2.95¢ for futures. Some inclination is shown to buy for November delivery, but not much beyond that.

## Philadelphia.

Office of *The Iron Age*, 220 South Fourth St., PHILADELPHIA, Pa., October 9, 1894.

The course of events during the past week have demonstrated that the improvement in business during August and September is not likely to be maintained during the later months of the year. There is a perceptible falling off in the demand, and while there is no quotable change in prices, it is felt that buyers could secure concessions providing the order was large enough to make it an object. There is no business of that character, however. All that any one wants is something to cover temporary requirements, the future being left to take care of itself. Prices are therefore nominally unchanged, but there is an undertone of weakness which is likely to become more prominent unless there is an early improvement in the demand. At the moment this can hardly be regarded as among the probabilities, as there is very little inquiry and no work in prospect that is likely to change the situation.

**Pig Iron.**—The demand is fair, but decidedly less active than it has been for some time past. Consumers appear to have covered their requirements for the next 30 or 60 days, so that new business is rather slow, and usually at pretty close to inside quotations. Furnaces are well sold up, however, and, while orders can be placed on terms somewhat in buyers' favor, there is no great pressure to sell, as such a course

would weaken prices without leading to any important increase in the volume of business. Under such conditions the outlook cannot be regarded as very satisfactory, although there is a possibility of quite a good reaction, providing the November elections are what most people are looking for. Until that time it is likely that matters will be left to take care of themselves, as consumers will not be inclined to increase their engagements, and, as already intimated, sellers would not make much headway, even if they tried to secure business by such slight concessions as might possibly be granted, providing firm offers were presented. Bessemer weaker, and could be done at \$13 @ \$13.25, but there is little or no demand at present. General quotations for Philadelphia and nearby points are about as follows, and 20¢ @ 30¢ less at such points as York, Harrisburg, &c.:

Bessemer.....	\$13.00 @ \$13.25
Standard No. 1 Foundry X.....	12.50 @ 12.75
Standard No. 2 Foundry X.....	11.50 @ 11.75
No. 2 Plain.....	10.75 @ 11.00
No. 1 Soft.....	11.50 @ 11.75
No. 2 Soft.....	10.75 @ 11.00
Standard Gray Forge.....	10.50 @ 10.75
Ordinary.....	@ 10.25

**Steel Billets.**—It is pretty much the same old story in Steel Billets. Makers will not concede anything worth naming, and consumers are just as determined not to buy until they can get better terms. October shipments are held at about \$19, delivered, later dates, \$18.25 @ \$18.75, but there is no business to report except in small lots at inside figures.

**Finished Material.**—The demand has dwindled to very small proportions and mills in this vicinity are all preparing to shorten their time. There is so little new business that the past three or four weeks have cleaned up nearly all the work that was in hand, and the main dependence now is on such small orders as can be had from day to day. Unfortunately there is nothing at all in the way of big work in prospect, and small orders are so few that they have not counted for much lately. Prices are very irregular—in fact, there is no price in the ordinary sense of the word. Buyers are asked to present their specifications, against which prices are made as low as may be warranted in each individual case. Bars are at the lowest figures ever quoted and so are Shapes; and although Plates are supposed to be about a tenth higher than they were during the spring months, it only needs a nice specification to bring them into line with other specialties. Nominal quotations for small lots are about as follows:

Grooved Skelp.....	1.25¢ @ 1.30¢
Standard Refined Bars.....	1.20¢ @ 1.25¢
Medium quality.....	1.10¢ @ 1.15¢
Tank Steel.....	1.30¢ @ 1.35¢
Heavy Plates.....	1.30¢ @ 1.40¢
Shell.....	1.50¢ @ 1.60¢
Flange.....	1.60¢ @ 1.80¢
Angles.....	1.40¢ @ 1.50¢
Beams and Channels.....	1.50¢ @ 1.60¢

**Old Material.**—The demand has fallen off considerably, and to effect sales prices would have to be reduced all around. There is very little disposition to buy, however, and holders are much discouraged at the turn the market has taken. Asking prices for lots delivered are about as follows:

Heavy Melting Steel.....	\$10.00 @ \$11.00
Light Melting Steel.....	8.00 @ 8.50
No. 1 Wrought Scrap.....	10.00 @ 11.00
Machinery Cast.....	9.00 @ 10.00
Wrought Turnings.....	8.00 @ 8.50
Cast Borings.....	6.00 @ 6.50
Old Iron Rails.....	11.50 @ 12.00
Old Car Wheels.....	9.50 @ 10.00

## St. Louis.

(By Telegraph.)

Office of *The Iron Age*,  
Bank of Commerce Building,  
St. Louis, October 10, 1894.

**Pig Iron.**—There is no improvement to note in Pig Iron, so far as prices are concerned, although the demand is decidedly better. Sales during the past week will foot up about 5000 tons, divided among the car works, stove foundries and architectural works. The demand runs largely to No. 2 Foundry and No. 1 Soft, with occasional sales of Gray Forge. The redeeming feature of the market is the general acceptance of Iron by consumers, who continue to take it as fast as shipped, which indicates that they are melting considerably more Iron than they were 30 days since. The general opinion is that a good volume of business will be in order without any improvement in prices during the balance of the year. We quote as follows for cash, f.o.b. cars St. Louis:

Southern Coke, No. 1 Foundry.....	\$10.75 @ \$11.00
Southern Coke, No. 2 Foundry.....	10.00 @ 10.25
Southern Coke, No. 3 Foundry.....	9.50 @ 9.75
Southern Car Wheel.....	16.50 @ 17.00
Gray Forge.....	9.00 @ 9.25
Ohio Softeners.....	14.00 @ 14.50

**Bar Iron.**—The placing of several orders for cars during the past week has stimulated business in this department. Jobbers report a fair trade, but prices continue weak and unsettled. Mills quote 1.05¢ for Common Bar. Jobbers ask 1.20¢ @ 1.25¢, according to quantity.

**Barb Wire.**—Orders are lighter and will continue so for some little time yet. Prices are uncertain, but ought to improve in view of a continuance of the agreement which has been in existence for six months past. At this writing there has been nothing definite done, and it is intimated that there is a possibility of the scheme not going through, as one of the largest mills has emphatically stated that they will not sign any agreement unless every mill in the country is included. Painted is quoted at \$1.70 @ \$1.75; Galvanized 40¢ @ hundredweight additional.

**Wire Nails.**—The situation is decidedly mixed. Prices are weak, and the air is full of rumors respecting pools, agreements, &c. One mill threatens this, and another that, while the jobbers sit quietly by ready to take advantage of any cut in prices. At this writing \$1.10 @ \$1.15 is quoted for carload lots, and while lower prices than these have been made yet they have not become general.

**Rails and Track Supplies.**—The improvement noted in our last report continues. Prices have now reached a level which ought to induce railroads to buy, and inquiries on the market indicate that they will avail themselves of the low prices now ruling. Steel Rails are inactive at \$26.50 @ \$27. Old Iron Rails are in better demand at \$11 @ \$11.25. Track Supplies are quoted as follows: Splice Bars, 1.30¢; Spikes, 1.65¢; Bolts, Square Nuts, 1.90¢; with Hexagon Nuts, 2¢; Steel Links and Pins, 1.50¢; Iron, 1.60¢.

**Pig Lead.**—The market does not show any signs of improvement, and 2.95¢ is now a fair market price. Sales are not large, and in the absence of any heavy demand prices are likely to re-

main stationary. Stocks of this metal continue to increase.

**Spelter.**—At 3.25¢ this metal is well supported. A steady trade is reported, but there is nothing in the way of large purchases.

Early Tuesday morning, October 9, a portion of the Tudor Iron Company's plant at East St. Louis, Ill., was destroyed by fire. As soon as the insurance can be adjusted the mill will be rebuilt. The mill has only recently been started after a season of idleness caused by the dull times. There are a large number of orders on hand which the company will fill as promptly as the circumstances will permit. They advise us that their stock of Iron is sufficiently large for them to take care of their customers.

## Pittsburgh.

Office of *The Iron Age*, Hamilton Building, }  
PITTSBURGH, October 9, 1894. }

In spite of a fairly large demand for Iron and Steel products, prices continue weak and on some lines are as low as have been reached at any time this year. Billets are perilously near the low prices of early in the year and the same is true of Bessemer Iron. However, there is the advantage at this time of a good demand, and for this reason the downward tendency in prices may be arrested at any time. The elections next month are expected by many to have a beneficial effect on business, as the verdict will undoubtedly show that any further revision of the tariff in the direction of lower duties is not desired. Persons who have been in the Iron and Steel trades for many years state that the outlook for next year is very encouraging. A heavy demand for goods is confidently looked for, and if this is realized prices may also show improvement. The railroads cannot much longer postpone purchases that should have been made long ago, and would have been made had the business situation warranted. That we will have a prosperous year in the Iron and Steel trades, and in all other lines as well, when 1894 has gone down into history, is certainly the wish of every person who has the best interest of his country at heart.

**Pig Iron.**—The blast furnace report for October 1 will undoubtedly show that September was the banner month of the year as far as production is concerned. Out of 27 stacks in Allegheny County only Soho was idle on October 1, and this is being shoveled out and may resume during this month. The 26 furnaces in Allegheny County made close to 170,000 tons of Iron last month, equal to about one fifth of the entire output of the country. In spite of the large output stocks are low, showing that our consumption is keeping well up with production, for the time being, at least. This is used as an argument by those who insist that the downward tendency in prices will soon be checked, and a recovery take place. However, the future of the market is very uncertain and depends altogether on the demand for finished material. In sympathy with Bessemer Pig, Mill Iron is lower in price, with a slightly improved demand reported. The situation in Foundry Iron is the same as has been noted from week to week for some time past. We quote as follows:

Neutral Gray Forge.....	\$9.75 @ \$10.00	Cash.
All-Ore Mill.....	9.75 @ 10.00	"
No. 1 Foundry.....	11.75 @ 12.00	"
No. 2 Foundry.....	10.75 @ 11.00	"
Bessemer.....	10.85 @ 11.00	"

We note a sale of 3000 tons of Bessemer for October and November delivery at \$10.90, Pittsburgh. Also a sale of 1000 tons for same deliveries at \$11, Pittsburgh. Also a sale of 500 tons of Gray Forge at \$9.75, Pittsburgh.

**Ferromanganese.**—We continue to quote at \$50, delivered at buyer's mill, for 80 % domestic. It is reported that this price has been slightly shaded where some unusual conditions were attached.

**Billets.**—Steel for October delivery is in fair request, but prices are lower. No sales are being made for November and December, as there is a very wide difference in the views of buyers and sellers as to prices. It is claimed that Steel works who have to buy part of their Pig Iron in the open market can hardly get out even, basing Pig Iron at \$11, delivered, and Billets at \$16 at mill. Billets for October delivery may be quoted at \$16, at maker's mill, and we note a sale of 500 tons at that price.

**Muck Bars.**—We continue nominal quotations of \$18.75 @ \$19, delivered, for best grades.

**Bars.**—The situation is very unsatisfactory from every point of view. Some mills are fairly well employed and refuse to meet the low prices being named by other concerns in need of orders to keep running. During the week prices have further weakened and are now as low as at any time this year. We quote Common Iron Bars at 0.95¢ @ 1¢, at mill, and Steel Bars at 1¢ @ 1.05¢, with the usual extras. Even these low prices have been shaded recently on desirable orders.

**Plates.**—No large contracts are reported as having been placed during the week. The demand is fair and we repeat quotations of last week, as follows: Tank Steel, 1.20¢ @ 1.25¢ in ordinary lots and 1.15¢ for desirable orders. We quote Flange Steel at 1.30¢ @ 1.40¢, and Shell at 1.25¢ @ 1.35¢, according to order.

**Structural Material.**—The large trade in Beams and Channels before referred to continues and prices are firm. A contract for about 1000 tons of Bridge material for Cleveland is expected to be let this week. We quote as follows: Beams and Channels up to 15 inch, 1.25¢ for desirable orders, and 1.30¢ @ 1.35¢ for ordinary business. Angles and Universal Plates we quote at 1.15¢ @ 1.20¢, according to order, and Tees at 1.35¢.

**Merchant Steel.**—A slightly improved demand for Tire Steel is noted, but otherwise the situation is unchanged. We quote as follows: Bessemer Machinery, 1.15¢ @ 1.25¢; Open Hearth Spring, 1.50¢ @ 1.60¢; Open Hearth Machinery, 1.40¢ @ 1.50¢; Machine Straightened Tire, 1.50¢ @ 1.60¢; Sleigh Shoe, 1.50¢ @ 1.60¢; Toe Calk, 1.70¢ @ 1.75¢.

**Sheets.**—The demand is very active and some of the mills are completely sold up for October delivery. Prices are very firm, our higher quotations being for early shipment, for which about \$1 per ton extra is being secured. We quote No. 27 Common Iron at 2.25¢ @ 2.30¢; No. 27 Steel, 2.35¢ @ 2.40¢. The demand for Galvanized Sheets is very heavy, and the recent slight advance is being maintained. We quote Galvanized Sheets at 75 and 10 % off, while for prompt shipment some mills quote 75 and 5 % off.

**Pipes and Tubes.**—The situation is the same as noted last week, both as regards demand and prices.

**Skelp Iron and Steel.**—We quote as follows: Grooved Steel Skelp, 1.05¢ @ 1.10¢; Sheared Steel Skelp, 1.15¢ @ 1.25¢; Grooved Iron Skelp, 1.25¢ @ 1.30¢, and Sheared Iron Skelp, 1.35¢ @ 1.40¢, less 2 % cash in ten days.

**Wire Rods.**—We are not advised of any transactions during the week and continue to quote at \$23.50 at maker's mill.

**Wire Nails.**—The recently established price of \$1 on a 60-cent average is being maintained, the trade sending in orders very freely at the new price. A new Wire Nail card has recently been issued by a concern not identified with the Wire Nail Association. There is a fair volume of business in Cut Nails and we continue quotation at 85¢ for the usual averages.

**Barb Wire.**—The demand is only fair and is much below expectations of makers. We quote Four Point Galvanized at \$2 @ \$2.05 Pittsburgh, and Plain Wire at \$1.25 at maker's mill.

**Connellsville Coke.**—For the week ending Saturday, September 29, there were 15,231 ovens active in the Connellsville region and 2343 idle, the estimated production for the week being 147,043 tons. Very little Furnace Coke is changing hands, all the furnaces having contracts for Coke up to the first of the year. We quote Furnace Coke at \$1 per ton, and Foundry Coke at \$1.05 to dealers.

## Cincinnati.

(By Telegraph.)

Office of *The Iron Age*, Fifth and Main Sts. }  
CINCINNATI, October 10, 1894. }

While the volume of current business in Southern Pig Iron is undoubtedly smaller than it was a month or two ago, there appears to be more Southern Iron selling than is currently produced and the shipments from the furnaces are trenching upon surplus stocks. We hear of some urgency to sell Southern Iron in the Northwest, but there has been no disposition to make concessions in price to effect larger sales, and the market may be said to be steady with sales of single carloads up to 1000 tons, and in the aggregate a fairly satisfactory volume of business. There have been considerable sales of Charcoal Iron and generally at lower prices, some lots which had been hypothecated in the Northwest were taken at low rates and caused Charcoal Iron to be reduced in price. As a rule Southern Coke Iron is well sustained in price, but the general tone is not very confident and if stocks were urged upon the market they could not long be sustained. Some Northern Iron is offered here at reduced prices, but there is not much demand for it. Quotations are as follows:

### Foundry.

Southern Coke, No. 1.....	\$10.25 @ \$10.75
Southern Coke, No. 2.....	9.75 @ 10.00
Southern Coke, No. 3.....	9.10 @ 9.25
Ohio Soft Stone Coal, No. 1....	14.50 @ 15.00
Ohio Soft Stone Coal, No. 2....	14.00 @ 14.50
Lake Superior Coke, No. 1.....	12.00 @ 12.50
Lake Superior Coke, No. 2....	11.00 @ 11.50
Hanging Rock Charcoal, No. 1..	16.00 @ 16.50
Hanging Rock Charcoal, No. 2..	15.50 @ 16.00
Tennessee Charcoal, No. 1.....	13.00 @ 13.50
Tennessee Charcoal, No. 2.....	12.00 @ 12.50

### Car Wheel and Malleable Irons.

Standard Southern Car Wheel	15.75 @ 16.75
Lake Superior Car Wheel and Malleable.....	14.25 @ 14.75

### Forge.

Gray Forge.....	8.75 @ 9.00
Mottled Coke.....	8.50 @ 8.75

## Birmingham.

BIRMINGHAM, ALA., October 8, 1894.

The market this week can be characterized as featureless. The general feeling seems to be that there is a tendency to weakening. Prices are reported to be slightly shaded, and no sales of any magnitude are reported. There is no apprehension of any decided change, either favorable or unfavorable, and if the furnaces do not get to pushing each other there is no danger of a drop in prices. An understanding has been had by the companies of this district on this subject. The market for Rails and Finished Material is in the nature of spurts of activity, with periods of dullness, just as might be expected from the present conditions.

**Pig Iron.**—One large corporation reports that the sales for August and September amounted to about 106,000 tons. Sales reported for last week are almost all less than 500-ton lots and are not as numerous as heretofore. Still, there is a healthy demand and current make is kept sold up. Immediate shipments are still pressing, especially for No. 3 Foundry and Gray Forge. No. 2 Soft also calls for urgent shipment. No. 2 Foundry is slow and accumulating, though stocks in general show no increase. No. 4 of Sloss Iron & Steel Company has blown in and is averaging 160 tons a day. This makes three out of four Sloss furnaces in blast. Collections are reported good. Shipments are mainly West, though a fair demand Eastward is now coming in. The weakening reported is mainly in No. 1 and No. 2 Foundry, which constitute a large proportion of make, without a corresponding demand. Freight changes have been passed over temporarily, but are reported as going into effect soon. Quotations are about as last week: No. 1 Foundry, \$8; No. 2 Foundry, \$7.50, top price; No. 1 Soft, \$7.50 @ \$7.65; No. 3 Foundry, \$7; No. 2 Soft, \$7.25; Gray Forge, \$6.50.

**Finished Material and Rails.**—The market is reported as having a downward tendency in prices, though the demand is fair and general and averages fully up to make of mill. Outputs are being increased steadily to meet demand.

## Financial.

While the general condition of business throughout the country is in many respects more satisfactory, the improvement during the week under review has been so slight as to be almost imperceptible. No radical change is to be recorded. Prices remain on the low level of the past few weeks, and purchases of manufactured goods are still smaller than was expected. Commenting on the fact, *Dun's Review* points out that it is not strange that such should be the case, considering that wheat and cotton—the chief money crops of the West and South—have, during the week, touched the lowest prices ever known for these staples, and appear likely to sink in value still further.

Yet, taking the country as a whole, there seems to be a gradual improvement in business, judging by the returns of bank clearings in all the principal clearing houses of the country for last week. The aggregate of clearings exhibited an increase of 11.8 % over those of the same week of last year, whereas the increase in the month of September was less than 6 %. Com-

parison with the first week of October, 1892, however, shows a decrease this year of over 22 %.

Reports of railroad earnings are not discouraging. The *Financial Chronicle's* compilations of returns from 73 roads for the third week in September fall little more than 3 % under those of a year ago; and 35 roads for the last week of the month fall only 2½ % under their receipts for the same period of last year, when the World's Fair passenger traffic largely added to the receipts of several of the roads.

A further encouraging proof, pointing to a more stable financial condition throughout the country, is afforded by the returns of failures, which, in September, were smaller, both as to numbers and the aggregate of liabilities, than in any other month of this year. According to *Dun's Review*, commercial failures in the third quarter of 1894 involved liabilities of \$29,361,196 exclusive of banking institutions and railroads, against \$82,469,821 reported a year ago for the same quarter, and for nine months of 1894 the liabilities have been \$131,094,502, against \$251,334,265 last year. The manufacturing liabilities were \$12,331,892, against \$23,605,864 reported a year ago, and in trading \$14,131,230 for the quarter, against \$58,814,176 a year ago. For the month of September the liabilities have been only \$6,897,124, of which \$2,904,373 were of manufacturing and \$3,650,092 of trading concerns. The failures for last week were 219 in the United States, against 320 last year.

Speculation in Wall street is still confined to the professional traders. The general public are not yet inclined to buy stocks; but neither will they sell those they possess. The bear campaign in the Stock Exchange last week, which resulted in depressing Sugar to such an extent as to weaken the whole market, culminated on Thursday, when a distinct improvement developed. In the latter days of the week the market became very much stronger and more buoyant, railroad stocks in particular showing a change for the better, both in point of activity and firmness. On Saturday the market showed, at the close, a gain in prices all round, the granger stocks especially having scored smart advances. Monday's market, however, did not maintain the strength with which it opened. A fresh slump in Sugar stocks, due to deft manipulation by "insiders," again served to weaken the whole line of securities. Rumors of political troubles in Europe and threatened complications in the Orient, with other disquieting news affecting the European exchanges, also gave an unsettled tone to the market.

The rise in foreign exchange which has taken place within the past few days on account of a heavier demand from remitters and an inadequate supply of cotton and grain bills, has also had a depressing effect on the stock market by reviving the talk of a possibility of the resumption of gold exports in the near future. Sterling bills are still about 1¢ in the pound below the rate at which exports were made in the spring, but the Continental exchanges are in such a condition that gold could not be sent to Germany and Austria without loss. Although this contingency may be averted by an increase in the offering of grain and cotton bills, the present situation does not offer very bright prospects for the anticipated importation of gold this autumn.

In the bond market railroad issues of the better class have commanded good

prices, and an increased outside interest is noted in even the more doubtful issues. State and municipal bonds have been fairly active. The general bond market, however, showed signs of returning weakness on Tuesday in sympathy with the course of the stock market. Government bonds have been steady and quiet. Closing prices on Wednesday were as follows:

	Bid.	Asked.
2's, 1891, registered.....	96	.....
4's, registered.....	113½	114½
4's, coupon.....	114	114½
5's, registered.....	119	119½
5's, coupon.....	119	119½

Little advance has been made during the week in the reorganizations of the great railroads. The Olcott Earle plan for the Reading system meets with increasing disfavor, both here and in London, and it is generally regarded as destined to failure. The chief event in the reorganization field has been the recommendation of the Union Pacific directors that an assessment of \$10 a share be levied, a proposal which appears to have been received with relief by the holders of Union Pacific securities as bearing less hardly on them than they had anticipated.

The Treasury gold reserve increases very slowly, and is still under the \$60,000,000 mark, a fact which makes the rumors of gold exports all the more ominous. A very small proportion of the total Government receipts comes in gold. During the first week of October the amount of the precious metal received at the New York Custom House in payment of duties was only \$645. The general condition of Treasury receipts is by no means encouraging, the rush of imported goods under the new tariff has slackened down very considerably, and internal revenue gains having fallen off. Judging by the figures for the first week of this month, it is calculated that receipts for October will run about \$9,000,000 short of expenditures, a sufficiently unsatisfactory state of affairs, calling for the serious attention of the Treasury Department.

A favorable feature of last Saturday's statement of the New York banks was an expansion of loans amounting to \$2,700,000. This was, however, accompanied by a rise of \$2,900,000 in deposits. The banks held about \$500,000 less cash than on the previous Saturday. Their surplus in excess of legal requirements now stands at \$59,450,000.

No change has occurred in the loan market, where the offering of funds still continues largely in excess of the requirements of borrowers. Call money is still quoted at 1 %; but three quarters of 1 %, and even one half of 1 %, are said to have been accepted lately. Time loans are still offered in abundance without corresponding demand, in which there has been, indeed, a falling off during the week. Rates are maintained on a very easy basis, and are quoted at 2 % for 60 days, 2½ % for 90 days, 3½ % for five months and 3¾ % @ 4 % for longer periods.

Mercantile paper is in good request, but business in this market is limited by the scant supply of good material offered. All that comes in is promptly absorbed. Rates are 3 % @ 3¾ % for indorser bills, 4 % @ 4½ % for high grade single names and 4½ % and upward for others.

Sterling exchange, as previously noted, is higher and firm. Actual business was done on Wednesday at \$4 86½ @ \$4 86½ for 60 days, \$4 87½ @ \$4 87½ for demand, \$4 87½ @ \$4 87½ for cables and \$4 85½ for commercial bills. Domestic exchange on New York was

quoted on Wednesday as follows: Charleston, buying  $\frac{1}{8}$ , selling par; Savannah, buying  $\frac{1}{8}$ , selling par; Chicago, 40¢ discount; New Orleans, commercial 125 discount, bank par; San Francisco, sight 12 $\frac{1}{2}$ , telegraph 15.

## Metal Market.

**Pig Tin.**—Prices have fallen sharply. On spot stock the decline is 0.20¢ @ 0.25¢, on October delivery about the same and on later deliveries 0.25¢ @ 0.30¢. Speculative dealings on the decline have been quite heavy. Sales and resales aggregate about 600 tons. Purchases by outside dealers and consumers have also been on a liberal scale, making in all a large volume of business. Some "short" sales have been made by speculators, but the selling was chiefly by operators in touch with the conflicting interests in Europe, and suggests that the foreign syndicate is more inclined to reduce than increase their holdings. There is superficial evidence of manipulation, such as is sometimes resorted to for the purpose of enabling large holders to realize some profit. To-day the market was stronger. Bids were made of 15.65¢ for Straits and 15.70¢ for Bonstead on the spot. While offerings were very moderate, 15.60¢ @ 15.62 $\frac{1}{2}$ ¢ was paid for lots ex ship in port, and 15.50¢ was bid for sellers' option, all October delivery. Late futures went at 0.10¢ above recent lowest figures.

**Copper.**—Dealings have been much smaller the past week than they were during the preceding one. The demand has been lighter also, and the market at this writing has a very tame appearance. Sellers offer reservedly, however, and claim that the statistical position is still in their favor. They quote 9 $\frac{1}{2}$ ¢ for Lake Superior Ingot, 9 $\frac{1}{4}$ ¢ for Electrolytic and 9 $\frac{1}{8}$ ¢ for common casting stock in round lots. Small parcels have realized a slight advance on those figures. If sales have been as large as reported during the past two or three months it is safe to presume that home consumers and exporters are supplied for the balance of the year.

**Pig Lead.**—Prices have undergone hardly any change during the period under review and at this writing they stand just about as they were a week ago, or at 3.15¢ @ 3.17 $\frac{1}{2}$ ¢ for common domestic, in round lots. Only a moderate business has been effected here, and buyers generally are indifferent about anticipating future wants to any great extent. Very little speculative business has been effected.

**Spelter.**—Late lowest offerings of Western Spelter in this market have been withdrawn. At one time a few carloads could have been secured at 3.40¢, but business has since been done at 3.45¢, and there are few sellers now at less than 3.50¢ for ordinary brands. The dealings here were moderate and the improvement in tone is due to purchases in the West for other account than Eastern consumers.

**Antimony.**—The market has remained steady, though quiet, at 7 $\frac{1}{2}$ ¢ for Hallett's and 9 $\frac{1}{2}$ ¢ for Cookson's, from store.

**Nickel.**—Prices still range between 35¢ and 40¢, as to size of lot and delivery.

**Tin Plate.**—The market is in a somewhat uncertain condition pending the arrival of Plates by steamers overdue and those that have recently sailed from British shipping points. Avail-

able stock for current delivery is thus kept moderate and orders for several sizes and grades are very difficult to fill at the moment. Spot prices are therefore difficult to quote with ordinary accuracy. The following, however, would appear very near to trade basis in wholesale lots, spot or near future delivery: Charcoal Tins: Allaway Grade, IC 14 x 20, \$4.20 @ \$4.25; IX 14 x 20, \$5 @ \$5.05; IC 20x28, \$8.40 @ \$8.50; IX 20 x 28, \$10 @ \$10.10; IC Melyn, &c., 14 x 20, \$4.75 @ \$4.80; IX Melyn, &c., 14 x 20, \$6.40; IC Melyn, &c., 20 x 28, \$9.50; IX Melyn, &c., 20 x 28, \$12.75; IC Lisvane, &c., 14 x 20, \$4.25; IX Lisvane, &c., 14 x 20, \$5; IC Lisvane, &c., 20 x 28, \$8.50; IX Lisvane, &c., 20 x 28, \$10. Coke Tins, Bessemer Steel, IC 14 x 20, full weight, \$4 12 $\frac{1}{2}$  @ \$4 15; 100 lb, \$3.80; 95 lb, \$3.75; 90 lb, \$3.65; IC 20 x 28, 200 lb, \$7.80; 180 lb, \$7.50; ICW 14 x 20, 100 lb, \$3.65; 90 lb, \$3.55; IC squares, full weight, \$4.20 basis; 100 lb basis, \$3.90 basis; Siemens Steel, IC squares, full weight, \$4.35 basis; 100 lb basis, \$4 basis. Charcoal Tines: M. F., IC 14 x 20, \$8; IC 20 x 28, \$12; Worcester, IC 14 x 20, \$4.75; IC 20 x 28, \$8.60; Dean, IC 14 x 20, \$4.10 @ \$4.15; IC 20 x 28, \$8.10 @ \$8.15; 100 lb, IC 14 x 20, \$3.90; IC 20 x 28, \$7.80; D. R. D. Grade, IC 14 x 20, \$3.90 @ \$3.95; IC 20 x 28, \$7.85 @ \$7.90; 100 lb, IC 14 x 20, \$3.85 @ \$3.90.

## New York.

Office of The Iron Age, 96-102 Reade street, }  
NEW YORK, October 10, 1894. }

**American Pig.**—Aside from a slight weakening tendency on the part of Southern Nos. 1 and 2 there have been no developments during the past week. We quote standard brands \$12.50 @ \$13 for No. 1; \$11 @ \$12 for No. 2, at tidewater. Southern Iron, same delivery, \$11.50 @ \$12 for No. 1; \$11 @ \$11.25 for No. 2; \$10.65 @ \$10.75 for No. 3; \$10.90 @ \$11 for No. 3 Soft, and \$11.15 @ \$11.25 for No. 1 Soft. Foundry No. 4 (Foundry Forge) is \$10 @ \$10.40.

**Spiegeleisen and Ferromanganese.**—Nothing has been done as yet. We continue to quote nominally \$20.50 @ \$21 for 20% Spiegeleisen, and \$48.50 @ \$50 for Ferromanganese, tidewater.

**Billets and Rods.**—The market is weaker, in sympathy with the West, Pittsburgh quoting \$15.75 for Billets and \$23 for Wire Rods. We quote tidewater, \$18.50 @ \$19 for Billets and \$25.50 @ \$26 for Wire Rods.

**Steel Rails.**—The Eastern mills report little business in standard Rails. Something is doing in Light Rails, which are a shade firmer.

**Track Material.**—We quote as follows for small lots: Spikes, 1.50¢ @ 1.70¢; Fish Plates, 1.20¢ @ 1.40¢; Track Bolts, Square Nuts, 2¢ @ 2.10¢, and Hexagon Nuts, 2.10¢ @ 2.30¢, delivered.

**Manufactured Iron and Steel.**—A Worcester firm of builders has taken the contract for the erection of the Devonshire Building in Boston, the material, about 800 to 1000 tons, being taken by a Western mill. The Broadway cable car shed, involving about 3000 tons of Structural Steel, has been let to a local firm of architectural builders. The material has not yet been placed. Two other structures are now being figured on. A specification for about 1000 tons of Bridge material calls for Iron. In the Plate trade an order for 150 tons for a gas holder to be built

by a concern in this vicinity may be noted. It went to a Central Pennsylvania mill. Orders for the Plates for 40 locomotives for a transcontinental road are in the market. The Troy Iron & Steel Company have reduced their prices on A. I. W. Bars to 1.90¢, Troy, and on its Best Best to 2.10¢, Troy. Plates and Bars are locally very dull. We quote: Beams up to 15-inch, 1.30¢ @ 1.50¢ for round lots; Angles, 1.30¢ @ 1.35¢; Universal Mill Plates, 1.25¢ @ 1.35¢; Tees, 1.40¢ @ 1.60¢; Channels, 1.35¢ @ 1.50¢, on dock. Steel Plates are 1.30¢ @ 1.40¢ for Tank; 1.40¢ @ 1.50¢ for Shell; 1.60¢ @ 1.65¢ for Flange, and 1.75¢ @ 2¢ for Fire Box, and 2¢ @ 2.25¢ for Locomotive Fire Box, on dock; Refined Bars are 1.15¢ @ 1.9¢, on dock, and Common 1.05¢ @ 1.15¢; Soft Steel Bars are 1.10¢ @ 1.30¢; Scrap Axles are quotable at 1.30¢ @ 1.50¢, delivered; Steel Axles, 1.30¢ @ 1.50¢, and Links and Pins, 1.40¢ @ 1.60¢; Steel Hoops, 1.40¢ @ 1.50¢, delivered; Cotton Ties, 67¢ @ 75¢ @ 45 lb bundle, tidewater; Machinery Steel, 1.20¢ @ 1.40¢; Toe Calk, 1.60¢ @ 1.70¢, and Sleigh Shoes, 1.15¢ @ 1.25¢; Tire, 1.25¢ @ 1.30¢, and Spring, 1.65¢ @ 1.70¢, delivered.

**Old Material.**—We note a sale of 500 tons of Old Iron Rails, sold by a coal road, at \$12.50 and brokerage.

As bearing on the municipal bond market, N. W. Harris & Co., the prominent brokers of New York, Boston and Chicago, note that, "on the Pacific Coast and in the Mississippi Valley, a large proportion of recent proposed issues of bonds have been voted down by the people; while in the Eastern and Middle States the tendency has been to take advantage of labor and materials for public improvements, and of the low rates for money, by putting out new bond issues of unusual number and magnitude. At the present writing, however, the aggregate amount of new issues in sight is much less than is usual at this season, and in view of the lessened supply of municipal securities and the uncertainty regarding the net earnings of most of the larger corporate enterprises of the country, we believe that we must look for a continued advance for two or three years, at least, in the market value of extra high grade bonds."

A decree has been issued by the Chilean Government fixing the opening of the Mining Exhibition at Santiago for October 14. A large proportion of the exhibits are not expected, however, to arrive until after that date.

Heavy sales of Scrap by those who dismantled the World's Fair Buildings are reported from Chicago. It may be interesting to note, in connection with Scrap, that shipments from New York to China have recently been arranged.

Returns received by the Director of the United States Mint indicate that the gold production of the world for the current year will reach quite \$175,000,000, if not more. The largest previous production was that of last year, which was \$157,000,000. The United States, Australasia, South Africa and Russia each showed a material increase in gold production for the first half of 1894, and that ratio will, it is believed, be easily kept up if not exceeded during the latter half of the year. The prospective total yield of the precious metal in the United States is estimated by Director Preston at \$43,000,000.



### Test of Compound Vertical Centrifugal Pump.

The following data of a test of a compound vertical centrifugal pump made by the San Francisco Tool Company of San Francisco, Cal., we take from a valuable article on "Centrifugal Pumps," by John Richards in *Industry*. The pump is located at the Campbell Water Company's Works, Campbell, Santa Clara County, Cal.:

#### Remarks.

This pump replaced a pair of 16-inch bore by 48-inch stroke Cornish pumps, which were built and put in last March and April by a well-known California company. Owing to the large amount of sand and gravel carried by the water of these wells the Cornish pumps proved their unadaptability from the moment they were started up. It was a matter of a few hours only before the pump barrels were filled with sand and gravel.

#### Particulars of Test.

Number of test.	Water.			Heads.		Revolutions per minute of pump.	Net indicated horse-power of engine.	Theoretical horse-power of lift.	Per cent. efficiency of pump, including pump friction.
	Width of weir in inches.	Depth of water on weir in inches.	Gallons.	Total friction head, including two check valves.	Total head.				
1	11 3/4	6 1/8	529	3.00	111.5	546	20.03	14.90	74.40
2	13 1/4	6 1/8	596	3.25	115.0	560	24.32	17.31	71.25
3	13 1/4	6 1/8	607	3.25	116.2	565	25.58	17.79	69.50
4	13 3/4	6 1/8	619	3.30	117.2	568	26.58	18.60	68.00
5	11 5/16	6 1/8	465	2.80	108.2	533	22.05	12.69	56.00
6	12 3/4	6 1/8	545	3.00	111.5	548	22.78	15.35	67.40
7	11 3/4	6 1/8	529	3.00	111.5	546	25.25	14.90	59.00
8	11 1/4	6 1/8	506	2.88	110.2	540	24.00	14.05	58.50
9	11 1/8	6 1/8	534	3.00	111.5	546	22.67	15.11	66.60
10	12 1/8	6 1/8	562	3.12	113.7	552	26.97	16.04	59.50
11	12	6 1/8	540	3.00	112.5	550	24.71	15.35	62.10
Totals...	134 1/16	...	6,032	33.60	1,238.8	6,054	265.54	172.09	712.25
Average	12.18	6 1/8	548	3.05	112.6	550.36	24.14	15.64	64.78

#### Report of Test.

Average total head..... 112.6 feet.  
 Average discharge head..... 87.6 feet.  
 Average suction head..... 22.07 feet.  
 Average capacity per minute..... 548 gals.  
 Average number of revolutions per minute..... 550.36 R. P. M.  
 Average friction head..... 3.05 feet.  
 Diameter of discharge pipe..... 7.62 inches.  
 Diameter of suction pipes..... 2-7.60 inches.  
 Average indicated horse-power of engine pumping..... 32.04 H.-P.  
 Average indicated horse-power of engine friction..... 7.90 H.-P.  
 Average power applied to pump belt..... 24.14 H.-P.  
 Average water delivered by pump..... 15.64 H.-P.  
 Average efficiency of pump.... 64 1/2 per cent.

#### Notes.

In the above tests the pump was in a pit 82 feet below the surface of the ground.

Power was transmitted to the pump by means of shafting, of which there is about 90 feet of 2 1/4 inch, and five couplings, all connected and standing vertically, and held in place by means of about 12 2 1/4 inch bearings. The upper end of the shaft runs through a bow frame in the usual manner and has a 22 x 18 inch pulley, and is connected to an Atlas engine (11 x 16 inches) by means of a 14-inch rubber belt. Pulley on engine is 66 x 14 inches.

Distance between centers of engine and pump pulley is 21 feet.

A wooden idle pulley, 20 x 18 inches, running on a 2 1/4 inch shaft between two 2 1/4-inch bearings keeps the belt taut.

In the above percentages of efficiency no deductions have been made for driving the 2000 pounds of shafting, couplings, pulley, &c., nor the friction of couplings and pulleys fanning the air, nor friction of the shaft in its many bearings and the idle pulley; neither was the loss in transmission (by quarter turn belt) between engine and pump deducted.

The only deduction made was the friction of engine running light, with driving belt off.

Signed, G. W. PRICE.  
 R. L. FRIER.

Even on top of the pump pistons gravel and dirt would pile up to a depth of from 2 to 5 feet, the depth being governed by the length of time the pumps would run before breaking down.

The centrifugal pump was driven by the same steam plant that was used to furnish power for the Cornish pumps. The difference in power required to operate the different pumps was noticeable in every detail.

In the tests above named the efficiency of the pumps was impaired by an unforeseen length of the suction head, due to a want of supply in the wells. This head sometimes reached 26 feet, giving a flow of only 2 to 2.5 feet per second, estimated as affecting the working result over the whole test from 3 to 6 per cent.

The suction pipes are about 30 feet long, but are perforated from the bottom up to within 26 1/4 feet of the pump.

In the fourth test the level of the water in the suction pipes was kept close to the limit set by the perforations in the pipes. Just before the fifth test the water went below the perforations, and the pump drew in air and partly lost its priming. This threw the impellers slightly out of balance.

In the fifth test there was a very small quantity of water owing to air being in the pipes and pump, and the efficiency was low from the fact that the impellers vibrated vertically, which caused more or less friction between the thrust collars and their bearings, and to the small quantity of water discharged.

By the time that the sixth test was made the pump was fairly well filled again, although there was a very perceptible variation in the quantity and efficiency during the remainder of the test. Still, this is a condition which is liable to exist at any time and under different circumstances, so they have been included in the log of tests. From the tests as made the efficiency obtained can be relied upon as representing average results when working under favorable conditions.

The water delivered by the pumps contained a large quantity of sand, which if introduced through the pipe into the cylinder would in time impair the efficiency of the balancing piston. To avoid this, and also to balance the shafting before starting the pump, the pipe was continued on up to the surface of the ground and then connected to a small reservoir in the bottom of the discharge flume, a strainer being placed over the aperture between the reservoir and the flume. In this manner clean water was obtained for the balancing piston.

The principal features of design and construction of this pump are as follows:

1. The proportion of the scroll chamber of the pump is such as to give a velocity of flow which this company have found by their experiments to be the most efficient.

2. The diameter and curve of the impeller blades are so proportioned that the water leaving the impeller has the same tangential velocity when it reaches the scroll chamber of the pump as the discharge water has when passing through said chamber. This avoids all loss of power from shock, impact and eddies, which always takes place in pumps not properly proportioned. To keep these velocities constant it is necessary with the higher heads to use two or more impellers.

3. The weight of the revolving parts must be maintained at all times in equilibrium. Any variation in the suction or discharge heads will not unbalance the shafting.

4. The impellers in the pump being inverted they are in equilibrium in so far as end thrust, leaving only the gravity of the rotary parts to be sustained by the balancing piston.

To this Mr. Richards adds: Since the foregoing matter was in type the engineer of the Campbell Water Company has apprised the makers of the pump described in the preceding test and notes, that a large tank was erected at an elevation of 44 feet above the old flume, and the pump discharge pipe connected to this tank of 20,000 gallons capacity, which is filled in about 30 minutes, or at the rate of 666 gallons per minute. The total head, including friction, the engineer estimates at 160 feet, and there is little doubt that it may be further increased if required.

The most singular part is that there has been no augmentation or change in the driving power, and the 44 feet of added head has certainly not produced resistance in accordance with the usually assumed law in such cases, or as the cube of the head or speed. The present case, and others of the kind, disprove by actual experiment any such limitation of head or resistances in centrifugal pumping.

A compilation of the daily reports of fire losses in the United States and Canada, received by the *Journal of Commerce* during the month of September, shows a total of \$10,149,000, a little less than the figures for September, 1893. The losses for the first nine months of this year are calculated to have been \$97,602,000, against \$121,832,700 in the same period last year. A considerable proportion of last month's losses were due to the destructive forest fires in Minnesota and Wisconsin. Otherwise the exhibit would have maintained the ratio of decrease which has marked all the months of the current year as compared with last year.

## British Metal Market.

[Special Cable Dispatch to The Iron Age.]

LONDON, October 10, 1894.

There has been a further fall in Pig Tin prices. The decline for the week is £1. 15/ @ £2. The market held steady until Monday, owing to reported heavy shipments. Later statements that the syndicate were selling freely of both spots and forwards caused a stampede, with results as above noted. The future of the market is uncertain, and dependent in a good measure upon the operations of the "bull" interest. Today the market was quiet, but prices were lifted to £69 10/ @ £69. 12/6 for prompt, and £69. 17/6 @ £70 for three months' futures.

Copper has been quiet the past days but was lively early in the week. Prices advanced somewhat and held quite steady under the influence of favorable American advices and increased consumptive purchases. There was a slight reaction from the highest point owing to small demand from consumers. Today the market has been quiet. Merchant Bars, £41. 2/6 for prompt and £41. 10/ for three months' futures. Best selected English, £44 @ £44. 10/.

The demand for Tin Plate has been restricted chiefly to small lines and special sizes. Rather more doing in Oil sizes, where sellers are willing to cut prices a trifle. Exports last month were 27,000 tons, against 25,000 tons in September, 1894. The quantity shipped to the United States was 17,000 tons and 13,000 tons respectively. Stocks at shipping ports now about 220,000 boxes and rapidly declining. Swansea quotations are as follows:

Bessemer Cokes, 1C.....	10/3 @
Siemens Cokes, 1C.....	10/6 @
J. B. Steel Cokes, 1C.....	10/6 @
Dean Fernes, 20 x 28 .....	22/ @ 23/
Charcoals, 1C.....	11/6 @ 12/6

Black Plates and Wasters continue in very good demand.

Pig Lead has been quiet, but prices have ruled a trifle higher, at about £9. 17/6 for Soft Spanish.

Spelter is flat at £15. 5/ @ £15. 10/ for ordinary Silesian, with demand tame.

The Pig Iron market has been quiet, but exports last month were 80,000 tons, against 77,000 in September, 1893. Warrants quoted to-day at 42/5 for Scotch, 35/4½ for Cleveland and 43/6 for Hematite.

State Commissioner of Labor John M. Sydenstricker has issued statistics showing the strides made in oil production in West Virginia. Between 1860 and 1876 the output was only 3,000,000 barrels, but in 1876 new fields were found, and the production that year was 1,200,000 barrels. Since that time new wells have been put in operation almost every week, until at this time there are over 2000 wells in operation, the output of which will this year be fully 10,000,000 barrels, worth at least \$8,000,000. The total cost of the oil plants, machinery, &c., is estimated at \$14,000,000.

## Duluth News.

The report of the St. Mary's Falls Canal for last month, just issued, gives some interesting statistics as to iron ore traffic. Ore movement through the canal for September was double that of the corresponding month last year, or 1,040,000 tons, against 571,000 tons, while the total movement for the year to October was 5,247,000 net tons, against 3,189,700 for the same period last year. Reduced to gross tons and increased by the Lake Michigan movement there is given a grand total of ore shipment from the Lake Superior region of about 5,884,000 gross tons, or less than 120,000 below the total expected by lower lake interests early in the season. The *Iron Age* stated in June that shipments would be considerably ahead of expectations and set the total at not far from 7,000,000 tons. It will be between that figure and 6,500,000 tons. Of the total the Goebic range has so far contributed 1,409,000 tons, the Mesaba 1,325,000, the Vermilion 860,000, and the Marquette and Menominee, 2,290,000 tons.

In the past week the Minnesota Iron Company, as was intimated two weeks ago, have closed an option on another excellent Mesaba property, and have secured a reduction in royalty from 30 and 35 cents to 25. The property is in section 34, township 58-17, is close by the projected line of the Duluth & Iron Range road to the St. Clair, McInnis & Rouchelleau Ray properties and others in which they are now or are about to become interested. Explorations have already begun on the property, supplementary to those made by P. L. Kimberley when he had control of the same property a year ago. The Minnesota company expect, during the present week, to take an option on 880 acres near this mine, all of which they will carefully explore during the winter. They will have the option of buying the entire tract at \$250,000, or a selected 400 acres of it at \$175,000, after six months of exploratory work.

Very extensive changes and improvements have been made in the Mountain Iron Mine of the Rockefeller syndicate, and it now has a body of uncovered ore 1200 feet long and from 500 to 600 feet wide. The entire length of the stripping is opened to steam shovel mining work by a deep cutting, in which shovels can work both sides the track. A complete electric light plant has been installed. It is claimed that 9000 to 10,000 tons of ore can be loaded daily for a year or more without further stripping. This mine is looked on to break all mining and shipping records in the near future. It has shipped so far this year 430,000 tons, leading all other Lake Superior mines, except, perhaps, the Chandler of the Minnesota Company, which has a very large record. The Oliver Mine on the Mesaba has shipped 420,000 tons so far, and will easily reach its expected total of 500,000. The figures for this and the Mountain Iron are enormous for mines in their second season.

Stripping contracts for the Mahoning Ore Company's great mine, in 57-22, near Hibbing, will be closed this week, and 200,000 yards of earth will be moved. The Rouchelleau-Ray Iron Land Company have put a drill at work in their property in section 17, 58-17, with the definite intention of reaching the bottom of the deposit. Over 10,000,000 tons had been proved up before the drill was set at work.

## Trade Publications.

WE HAVE RECEIVED from the Dodge Mfg. Company of Mishawaka, Ind., and 43 Dey street, New York, a catalogue of their appliances for the transmission of power, which includes everything necessary to a complete line of power transmission. From a description of the power distributing plant of their own works we take the following: "Distribution of the power from the main drive to the several department line shafts is accomplished through the jack shaft equipment, requiring six independent drives of various capacities, ranging from 75 to 200 horse-power, and in distances from 75 to 600 feet. Each driver sheave is connected to the main shaft through a friction clutch, permitting closing down or starting up each department at will. This operation is facilitated by the use of electrical clutch let offs and alarms, which will automatically shut down any drive in case of accident to ropes or shafting. The ropes are unaffected by wind or weather, and transmit power noiselessly and without slippage. Nearly all of the driven shafts are at different angles to the jack shaft. This, however, in no way detracts from the efficiency and simplicity of the connections. The ropes pass in the air at sufficient height to clear all possible obstructions, towers supporting carrier sheaves being provided for the purpose. This plan of distributing power for large manufacturing plants is a perfect success and places the connections all under one head. Power is delivered economically and positively to all departments."

THE BOSTON CASTING COMPANY of 122 West First street, South Boston, Mass., manufacturers of castings "having all the characteristics of wrought iron," have issued a pamphlet in which they mention the advantages of the castings made by them. It is stated that the castings have a tensile strength of from 60,000 to 70,000 pounds, and can be readily welded to themselves or to ordinary bar iron. They can be drawn out under a hammer, hot, and afterward bent double without cracking. Without being drawn out, they can usually be bent to a right angle without giving way. The castings do not require annealing, even the thin fins being soft and ductile and with chill.

A SUPPLEMENTARY CATALOGUE on tumbling barrels and exhaust fans has been issued by the J. D. Smith Foundry Supply Company of Cincinnati, Ohio. This describes various patterns of tumbling barrels and fans and presents plans for the placing of a number of tumbling barrels together, and also shows the manner of attaching the exhaust to them.

WE HAVE RECEIVED a catalogue and price list of the Buffalo Meter Company of Buffalo, N. Y., makers of water meters. This meter is of the disk type. It is stated to be especially sensitive at small flows.

WE HAVE RECEIVED from Thomas Carlin's Sons of Allegheny, Pa., a copy of their seventh illustrated catalogue. This describes their hoisting engines of several types, portable cranes, derricks, pumps, steam engines and boilers, brick machinery, &c. The new plant of this firm, consisting of foundry, boiler, wood working and machine shops, with the full complement of tools, permits their building and handling heavy and light work of almost every description.

THE BABCOCK & WILCOX COMPANY of 29 Cortlandt street, New York, now issue their well known book, "Steam," in English, German and French. This book, in addition to describing the Babcock & Wilcox water tube boiler, presents information of the greatest value to all steam users.

The London *Economist* gives details of a number of American railroad bonds that have shown good profits in the last ten years, and points out that the list of good American bonds in London is very small, and that there is a sphere for profitable investment in New York.

# HARDWARE.

## Condition of Trade.

**T**HERE is a good deal of unevenness in the market, not only in the matter of prices, of which the trade are well aware, but also in the volume of current business. This feature of the situation is illustrated in the fact that some houses report September trade as nearly, if not quite, up to that of 1892, while the large majority of concerns are justified only in referring to business as somewhat in excess of 1893. In certain lines of goods, Builders' Hardware, for example, there is a less active demand than for others, while seasonable goods and some kinds of staple Hardware are moving more freely. Business is also much better in some sections of the country than in others, and at the present time there is no doubt that trade in the South, especially the Southwest, is in a gratifying condition. Reports from New York State trade are not very satisfactory and in New England there is also complaint of sluggish business, and collections in many places are difficult. On the whole the volume of trade is moderate and a little spasmodic and irregular. A large amount of goods in the aggregate are changing hands, and the retail merchants are sorting up their stocks with a little more liberality than for some time. They are still buying cautiously and the stocks in dealers' hands continue low.

### Chicago.

(By Telegraph.)

The demand for Shelf Hardware is running about the same as it has been, but here and there a note of complaint is heard. Most jobbers, however, say that they expect somewhat of a falling off at this time of the year, being between seasons. The philosophical are extracting comfort from the situation by believing that it means heavier business after a while. They think that if merchants should stock up now they would carry the goods on their shelves until spring and be unable to pay for them, and therefore it would be considerably better for the jobbing trade to pass through a comparatively quiet time from now until the spring trade begins and then have it come along with its old-time vigor. The impression seems to prevail quite generally that spring business will be as heavy if not heavier than usual. The only

matter of consequence transpiring during the week was the settling of Tin Plate prices. Jobbers have now pretty well agreed upon a price of \$5.75 as a basis for Calland and Melyn grades, \$5.50 for Allaway, \$5 for Bright Coke Plates, \$10 for Terne Plates, Mansel grade, and \$10.50 for Worcester brands. The demand for staple goods is fair, except for Barb Wire, in which trade is quite light.

### St. Louis.

(By Telegraph.)

The Hardware jobbers continue to report a very satisfactory trade, one house receiving 2000 separate orders in two days. The volume of business is particularly heavy in Illinois, Missouri, and Texas, while a good trade is reported from nearly every section of the South and Southwest. A peculiar feature of the market is the extraordinary demand for Builders' Hardware, which is far in excess of what was anticipated. The uncertainty in the Screw market continues, but as nearly all dealers have loaded up, the weakness does not cut any material figure. Prices are not satisfactory, and as staple goods are being cut, there does not seem much hope for any immediate improvement. The Barb Wire and Wire Nail situation is decidedly mixed, and jobbers are buying from hand to mouth as their needs require. The demand for Cutlery is heavy, which is largely caused by the reduction in prices, which will average from 15 to 20 per cent.

## Notes on Prices.

**Wire Nails.**—The Wire Nail market is in a peculiar and not very confident position. The price of \$1 for carload lots at mill is quite regularly maintained, though in some cases where Nails are delivered the manufacturers realize something less than this figure. The volume of business is not especially large, as buyers are waiting to see what the developments of the market may be and whether the manufacturers will succeed in eliminating the disturbing influences which to a greater or less extent have been felt for the past month or two. It would seem that as yet their efforts in this direction have not been entirely successful. The mills are nearly all of them fully occupied on orders and report that the amount of current business is fair. The New York price continues \$1.20 on dock and \$1.25 to \$1.30 from store.

*Chicago, by Telegraph*—Inquiries are light. The developments of the past two or three weeks have evidently

scared buyers and they are now waiting to see whether the market has settled, being unable to determine just what course to pursue. Meanwhile manufacturers are endeavoring to get their matters into better shape. The leading makers profess indifference toward competition from the irregular trade and some have withdrawn completely from the market for the time being to wait until prices have recovered their firmness. They quote \$1 at mill and refuse to take anything below that price. Jobbers report a good demand for small lots from stock, but have reduced their quotations and now name \$1.10 to \$1.15 for such lots.

**Cut Nails.**—The movement of Cut Nails, while not especially heavy, is fair, and manufacturers in view of the general business condition are not disposed to complain. Prices are well maintained and are represented by the quotation of 90 cents, 60-cent average, for carload lots on dock, New York. The competition of Western mills is active, but the Eastern manufacturers are holding their territory pretty well. Small lots from store are held at \$1.05 to \$1.10 with the usual average.

*Chicago, by Telegraph.*—This trade is moving in about the same condition as reported last week. The demand on manufacturers is quite good, but runs only to small lots, which are selling at the old price of 95 cents for 60-cent average. Jobbers have slightly reduced their prices out of stock and now quote small lots at \$1.05.

**Barb Wire.**—The Barb Wire market is sluggish and the demand light and spasmodic. Four-Point Galvanized is quoted as follows, delivered at the points named in carload lots: Pittsburgh, \$2 to \$2.05; Cleveland, \$2.05 to \$2.10; Cincinnati, Allentown, Chicago or New York, \$2.15 to \$2.20.

*Chicago, by Telegraph.*—Manufacturers report that a few orders are being entered for spring delivery, but this business is by no means up to expectations. The carload trade for early delivery is quite light. Jobbers are selling small lots of Galvanized from stock at \$2.25, but report that very little is moving at present.

**Gypsy and Trixy Hair Curlers.**—These Curlers were described in our last issue as put on the market by the Trixy Hair Curler Company, Cincinnati, Ohio. They are sold to the trade at the following net prices:

	Gypsy.	Trixy.
1 to 5 dozen, per dozen	\$3.60	\$4.80
6 to 11 " " "	3.30	4.50
12 " " "	3.00	4.20

**American Bolt Company.**—The following quotations, which we have received from the American Bolt Company, Lowell, Mass., will be of interest as indicating the ruling prices on the goods made:

	Discount.
	Per cent.
Machine Bolts.....	85 and 10
Pipe Bolts.....	85 and 10
Loom, or Cuphead Bolts.....	75 and 10
Tap Bolts.....	80 and 20
Forged Set Screws.....	80 and 20
Blank Bolts.....	85 and 10
Bolt Ends.....	85 and 10
Hanger Screws.....	80
Lag ".....	85 and 20
Coach " gimlet points.....	85 and 10
Set " iron.....	70 and 10
" steel.....	70 and 10
Round and Fillister Head Cap Screws.....	50 and 10
Square Head Cap Screws.....	65 and 10
Hexagon ".....	60 and 10
Rough Stud Bolts.....	75
Milled Iron Studs.....	60 and 10
Pressed Iron Turnbuckles.....	40
Forged ".....	70
Coupling Bolts.....	70
Track " $\frac{1}{2}$ , $\frac{7}{16}$ , $\frac{3}{8}$ .....	85 and 10
Cents per lb.	
Square and Hexagon Nuts, U. S. S. sizes, Chamfered, Tricomed and Drilled.....	5.5
Square Nuts, U. S. S. sizes, plain.....	5.6
Hexagon ".....	5.8
Square Nuts, Manufacturers' Standard, plain.....	5.6
Square Nuts, Manufacturers' Standard, C. T. and D.....	5.5
Hexagon Nuts, Manufacturers' Standard, plain.....	5.8
Hexagon Nuts, Manufacturers' Standard, C. T. and D.....	5.5
Square Nuts, extra sizes, plain.....	5.6
" cupped.....	5.5
Hexagon Nuts, " plain.....	5.8
" cupped.....	5.5
Check and Jam Nuts.....	5.5
Per cent.	
Tapped Nuts.....	50
Finished and Case Hardened Nuts to $1\frac{1}{4}$ inches.....	70
Finished and Case Hardened Nuts to $1\frac{1}{2}$ inches and larger.....	60
Semi-finished Nuts to $1\frac{1}{4}$ inches.....	70
" " $1\frac{1}{2}$ " and larger.....	60
Cents per lb.	
Plate Washers.....	5.6
Square ".....	5.6

**Columbian Sash Balance.**—This Balance was illustrated in our issue of the 20th ult. It is manufactured by the Columbian Sash Balance Company, Richmond, Ind. The Balance is sold to the trade at \$21 per dozen, f.o.b. Richmond.

**Empire Stencil Dauber.**—Empire Forge Company, Lansingburg, N. Y., are manufacturing this article, which was described in our last issue. The Dauber is sold to the trade at \$12 per gross, subject to a discount of 25 per cent.

**Eyeless Steel Pick.**—The Eyeless Steel Pick, manufactured by the Eyeless Tool Company, 223 East Twenty-second street, New York, Wiebusch & Hilger, 84-86 Chambers street, New York, sole agents, an illustrated description of which was given in *The Iron Age* of last week, is sold from the following list subject to a discount of 50 per cent.:

Weight.	Per dozen.
$1\frac{1}{4}$ to 3 pounds Pick.....	\$12.00
4 " ".....	14.00
5 " ".....	16.00
6 " ".....	18.00
7 " ".....	20.00
8 " ".....	22.00
7 " Tamping Picks.....	24.00
8 " ".....	26.00
9 " ".....	28.00

The company carry constantly in stock a full line of Pick Handles adapted to

these Picks, for which extra is charged; the price of handles not being included in the foregoing list.

**Stove Boards.**—The following are the prices for the present season on Stove Boards manufactured by the American Stove Board Company, 206 Water Street, New York, and 110 Ontario street, Chicago. The prices named are subject to a discount of 2 per cent. for cash:

<i>No. 70, Round, Wood Lined, Crystal.</i>				
In. diam.....	27	30	33	36
Each.....	\$1.02	1.14	1.26	1.38

<i>No. 80, Square, Wood Lined, Crystal.</i>				
Inches.....	26 x 26	28 x 28	30 x 30	33 x 33
Each.....	\$1.02	1.14	1.26	1.38

<i>No. 90, Oblong, Wood Lined, Crystal.</i>				
Inches.....	24 x 36	26 x 32	28 x 34	30 x 33
Each.....	\$1.14	1.14	1.26	1.38

<i>No. 10, Round, Wood Lined, Oxidized.</i>				
In. diam.....	27	30	33	36
Each.....	\$1.08	1.20	1.32	1.44

<i>No. 20, Square, Wood Lined, Oxidized.</i>				
Inches.....	26 x 26	28 x 28	30 x 30	33 x 33
Each.....	\$1.14	1.26	1.38	1.50

<i>No. 30, Oblong, Wood Lined, Oxidized.</i>				
Inches.....	24 x 36	26 x 32	28 x 34	30 x 33
Each.....	\$1.26	1.26	1.38	1.50

<i>No. 700, Round, Wood Lined, Embossed.</i>				
In. diam.....	27	30	33	36
Each.....	\$0.96	1.08	1.20	1.32

<i>No. 800, Square, Wood Lined, Embossed.</i>				
Inches.....	26 x 26	28 x 28	30 x 30	33 x 33
Each.....	\$0.96	1.08	1.20	1.32

<i>No. 900, Oblong, Wood Lined, Embossed.</i>				
Inches.....	24 x 36	26 x 32	28 x 34	30 x 33
Each.....	\$1.03	1.08	1.20	1.32

<i>No. 40, Round, Paper Lined, Zinc.</i>				
In. diam.....	24	26	28	30
Each.....	\$0.48	.54	.60	.66

<i>No. 50, Square, Paper Lined, Zinc.</i>				
Inches.....	24 x 24	26 x 26	28 x 28	30 x 30
Each.....	\$0.54	.60	.67	.75

<i>No. 60, Oblong, Paper Lined, Zinc.</i>				
Inches.....	22 x 34	24 x 36	26 x 30	
Each.....	\$0.60	.72	.72	

<i>No. 100, Round, Paper Lined, Crystal.</i>				
In. diam.....	24	26	28	30
Each.....	\$0.54	.60	.66	.72

<i>No. 200, Square, Paper Lined, Crystal.</i>				
Inches.....	24 x 24	26 x 26	28 x 28	30 x 30
Each.....	\$0.60	.67	.75	.86

<i>No. 300, Oblong, Paper Lined, Crystal.</i>				
Inches.....	24 x 36	26 x 30	28 x 32	30 x 36
Each.....	\$0.78	.78	.90	1.02

<i>No. 45, Round, Paper Lined, Embossed.</i>				
In. diam.....	24	26	28	30
Each.....	\$0.48	.54	.60	.66

<i>No. 55, Square, Paper Lined, Embossed.</i>				
Inches.....	24 x 24	26 x 26	28 x 28	30 x 30
Each.....	\$0.54	.60	.67	.75

<i>No. 65, Oblong, Paper Lined, Embossed.</i>				
Inches.....	24 x 36	26 x 30	28 x 32	30 x 36
Each.....	\$0.72	.72	.78	.90

<i>No. 100, Round, Paper Lined, Crystal.</i>				
In. diam.....	24	26	28	30
Each.....	\$0.54	.60	.66	.72

<i>No. 200, Square, Paper Lined, Crystal.</i>				
Inches.....	24 x 24	26 x 26	28 x 28	30 x 30
Each.....	\$0.60	.67	.75	.86

<i>No. 300, Oblong, Paper Lined, Crystal.</i>				
Inches.....	24 x 36	26 x 30	28 x 32	30 x 36
Each.....	\$0.78	.78	.90	1.02

<i>No. 45, Round, Paper Lined, Embossed.</i>				
In. diam.....	24	26	28	30
Each.....	\$0.48	.54	.60	.66

<i>No. 55, Square, Paper Lined, Embossed.</i>				
Inches.....	24 x 24	26 x 26	28 x 28	30 x 30
Each.....	\$0.54	.60	.67	.75

<i>No. 65, Oblong, Paper Lined, Embossed.</i>				
Inches.....	24 x 36	26 x 30	28 x 32	30 x 36
Each.....	\$0.72	.72	.78	.90

**Cordage.**—The Cordage market is on the whole in not so satisfactory a condition as for the past month or two, the demand being light and prices showing symptoms of weakness. Although no reductions have been made

on Manila and New Zealand, Sisal has been reduced  $\frac{1}{2}$  cent per pound.

**Hard to Beat Sash Fastener.**—The Hard to Beat Automatic Sash Fastener, illustrated in this issue, and manufactured by the Hard to Beat Automatic Sash Fastener Company, 85 Spring street, New York, is sold at a discount of 60 per cent. from the following list:

	Per dozen.
Nubian Bronze.....	\$2.50
Real ".....	6.00
Brass, Polished and Laquered.....	8.00

**Glass.**—The past week has witnessed no change in the condition of the American Window Glass market, either in demand or prices. Trade continues about the same, with no indication of the increase in business naturally expected at this season of the year. There is a lack of uniformity in the prices made by jobbers in different parts of the country, but Pittsburgh factory prices remain 88 per cent. discount for single and 90 per cent. discount for double, in lots of from 3000 to 5000 boxes, with  $2\frac{1}{2}$  per cent. additional discount for cash in either strength. As reported last week New York importers adopted a revised list on foreign Glass, from which a discount of from 60 and 10 and 5 to 70 per cent. is allowed. A discount of 70 per cent. from the new list is about equivalent to 80 and 10 and 10 and 5 per cent. discount from the former list; which latter price, it is understood, Boston importers are selling at, from the old list. The Plate Glass trade continues encouraging, and factories, it is reported, are well sold up, although the tendency is toward lower prices. The average prices in New York and New England are stated to be 70 and 10 per cent. discount on sizes 5 feet and over, and 75 and 10 per cent. discount on sizes under 5 feet, from the Eastern list. From Western manufacturers' list reported discounts are 70 and 10 and 5 per cent. discount on sizes over 10 feet, and 70 and 10 per cent. discount on 10 feet and less.

**New Era Axle Sash Pulley.**—This Pulley was described in our last issue as put on the market by the Empire Forge Company, Lansingburg, N. Y. It is sold to the trade from the following list, which is subject to a discount of 65 per cent.:

<i>Plain Face, Plain Wheels.</i>	
Face Plate, Sq. End.	
No. 0109, $1\frac{1}{4}$ -inch, $4\frac{1}{2}$ x 1 inch.....	\$0.58
No. 0116, 2 " $4\frac{1}{16}$ x 1 inch.....	.56

<i>Plain Face, Ground Wheels.</i>	
Face Plate, Sq. End.	
No. 0109, $1\frac{1}{4}$ inch, $4\frac{1}{2}$ x 1 inch.....	.55
No. 0116, 2 " $4\frac{1}{16}$ x 1 inch.....	.58

<i>Plain Face, Plain Wheels.</i>	
Face Plate, Rd. End.	
No. 0411, $1\frac{1}{4}$ -inch wheels, 4 x 1 inch.....	.50
No. 0412, 2-inch " $4\frac{1}{2}$ x 1 inch.....	.55

<i>Plain Face, Ground Wheels.</i>	
Face Plate, Rd. End.	
No. 0411, $1\frac{1}{4}$ inch wheels, 4 x 1 inch.....	.53
No. 0412, 2-inch " $4\frac{1}{2}$ x 1 inch.....	.58





How Small Retailers May Keep a Record of Prices.

BY J. E. JANSSEN.

IT IS TO BE PRESUMED that every small retailer of Hardware does the bulk of his buying, at least of his staples, of some one jobbing house; but in any case he has or can obtain a jobber's catalogue. This

These sheets (preferably of linen paper) are divided by pencil rulings perpendicularly to form three spaces, which are headed by the numbers of pages to which they refer. When ready to begin the system the prices of all articles on bills from the jobber should be entered in the proper column, on the interleaved sheets, by the excellent plan of noting discounts. Where arti-

Interleaved Page.

Goods are frequently billed by jobbers at varying prices, independent of market changes; where special prices have been accorded on certain articles, such may be overlooked by the jobber's entry clerk in subsequent transactions. In posting up prices as heretofore described any difference is at once noted, and unless an advance has

<p>pp. 307-8</p> <p>Buttons Pliers Kg %</p> <p>7/10-90 BK 122 P. 56</p> <p>Acme Pliers mg %</p> <p>1/19-93 BK 271 P. 59</p>	<p>pp. 309-10</p> <p>Register Calipers lm %</p> <p>quoted R. I. Mfg. Co 3/11-92</p> <p>Bx of Shavers elm net</p> <p>4/7-91 BK 281 P. 33</p>	<p>pp. 311-12</p> <p>Washer Cutter # X</p> <p>from L. R. Co special</p> <p>ld % 3/4-92</p>
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Fig. 1.—Interleaved Sheet.

<p>No 307</p> <p>Against Stevens &amp; Co.</p> <p>Date Dec 8/92</p> <p>Bill Nov 18/92</p> <p>10 % overcharge</p> <p>of 1/2 doz * X Handaxes</p> <p>(O. B.)</p> <p>Total 75¢</p>	<p>No. 307</p> <p>Eureka, Cal., Dec 8. 1892</p> <p><u>Claim</u> for overcharge on Bill Nov 18/92 It 162 Page 34</p> <p>McP. Stevens &amp; Kerns</p> <p>Please credit our account as follows:</p> <p><b>E. JANSSEN &amp; CO.</b></p> <table><thead><tr><th colspan="3">REFER TO:</th></tr><tr><th>INV.</th><th>BK.</th><th>PAGE.</th></tr></thead><tbody><tr><td>July 14/92</td><td>148</td><td>11</td></tr><tr><td colspan="3">1/2 doz "Our Brand"</td></tr><tr><td colspan="3">Handaxes #X @ 15-</td></tr><tr><td colspan="3">30 %</td></tr><tr><td colspan="3">525</td></tr><tr><td colspan="3">Shavers @ 40 %</td></tr><tr><td colspan="3">450</td></tr><tr><td colspan="3">Office charge</td></tr><tr><td colspan="3">8-75</td></tr></tbody></table>	REFER TO:			INV.	BK.	PAGE.	July 14/92	148	11	1/2 doz "Our Brand"			Handaxes #X @ 15-			30 %			525			Shavers @ 40 %			450			Office charge			8-75		
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Fig. 2.—Claim Blank Filled Out.

should be of the house he principally deals with, because it is the one to which most frequent reference is had and therefore will best adapt itself to my plan of keeping a record of prices. The catalogue should be interleaved at every third leaf with a thin sheet of closely ruled paper, in size enough smaller than the catalogue sheet to avoid covering the page number.

cles are sold at net prices such, of course, are noted; all entries to be made on the sheets referring to the respective pages on which the articles are listed. In the course of a year a very complete record is thus accumulated. Not only is this valuable for the purposes of a general price book, but it is a ready and efficient means of noting overcharges.

occurred the basis for a claim is established. A specimen page taken from a record of prices kept in this way is shown in Fig. 1. Book, page and date of bill are noted in each case, avoiding the necessity of recourse to bill book, ledger, or other sources for the requisite data. Only one price or discount is noted on any article, which stands until a change occurs, when it

is erased and the new price substituted. All entries to be written with pencil.

#### An Overcharge.

Presuming that an overcharge has been made on, say, Hand Axes at 30 per cent., whereas previous price was 40 off; the data being all at hand, a claim is then made out, preferably on a blank form, of which a supply should be kept on hand. A form of claim is filled out to adjust the above overcharge, as shown in Fig. 2. By this system the record of prices is always up to date, and the person making the entries is kept familiar with all changes. Under the proper head a record is also kept of such new goods as may not be included in the catalogue, but properly belong there, and of articles bought out, for any data concerning which there might otherwise be endless searching. Bills need not be entered immediately upon receipt; the work can be done at stated intervals. After seeing this system in operation for a number of years, it commends itself as being well adapted to a small business; it is not cumbersome and sufficiently elastic to cover the requirements even of a larger business.

#### A Pocket Price Book.

The aid of a pocket price book for the head salesman need not be dispensed with—say one of *The Iron Age* series. Such a book could contain cost prices of all special articles and others that were drawn from outside sources, or such not coming within the direct line of the jobber's stock, of which some dealers have more, some less, according to the nature of their business. The purpose of such a book would be:

1. To have a record of cost prices on goods not regularly but occasionally handled, or articles that are seasonable only for a short period, and not carried all the year, and all belonging to a class not supplied by the jobber.
2. To keep a record of the selling prices of certain lines wherein a wide difference is made between the price of a single piece and a dozen. Under this head come numerous articles of Building Hardware and also of other lines. A pair of Butts retailing at 10 cents would perhaps sell by the dozen pairs at 75 cents. The use of a price book in the aforesaid manner would insure uniformity in the establishment of fixed prices on such articles.

#### Special Prices.

In any small business the quoting of special prices should remain in the hands of one man—i. e., head salesman or proprietor. Competition and various other circumstances often combine to establish low prices on certain articles in some localities. These prices would be recorded in the price book, and would be entirely independent of the regular retail price on the line of goods indicated. All this does not predicate the superfluity of price-lists (Root's price cards have been found very useful), especially for goods representing a long line of sizes or finishes, such as Butts, Hinges, Chisels, Bits, &c. But

these lists cannot and should not be altered every time that a slight change occurs in the discount. They serve almost wholly as a guide for selling prices, and, where goods are not sampled, as a record of stock sizes and numbers carried in the particular business.

#### Keeping Up the System.

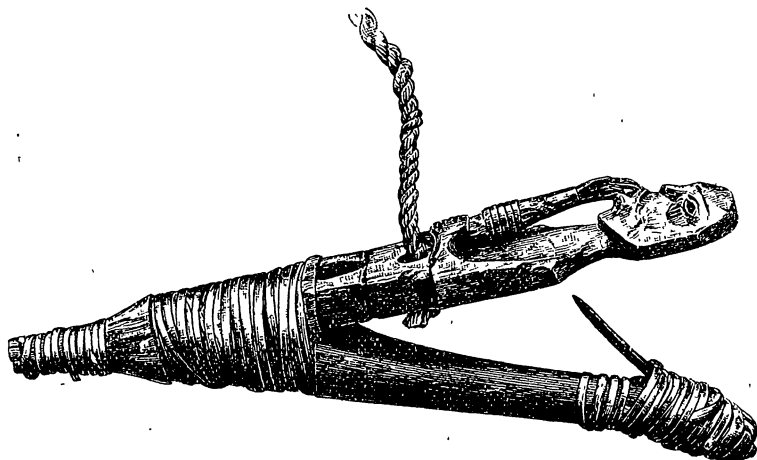
Having established and maintained such a period the way is paved for enlarging upon it as the scope of the business may demand. The practical value of keeping a record of prices thus being sufficiently demonstrated, its continuance becomes a matter of interest rather than a perfunctory duty. Moreover, the recording of each price in the catalogue, by direct contact, familiarizes the mind with the illustrations, descriptions and contents in a manner not accomplished in any other way. The systematic study of a

In this connection we may mention that George P. Benjamin, 104 Chambers street, while visiting the Pacific Coast last summer, extended his trip to Alaska, and brought back as souvenirs a rather formidable Dagger, made by the natives of the bone of some large fish, and a Fish Hook made on the same principle as the one illustrated, differing slightly in detail only.

The Dagger is 23 inches long and  $2\frac{1}{2}$  inches greatest width, flat on one side, the obverse side being grooved slightly in the center and then beveled toward both edges. A space 3 inches long and  $1\frac{1}{4}$  inches wide is cut out  $5\frac{3}{4}$  inches from the top and covered with coarse red muslin, to serve as a handle. The flat portion above the handle is carved in an aboriginal way to represent a human face.

#### Warner Lock Company.

THE AFFAIRS of the Warner Lock Company of Chicago have at length been satisfactorily adjusted, and the company have resumed



Alaskan Fish Hook, About One-third Size.

good Hardware catalogue leads to a mastery of goods and prices, the A B C of business.

#### Aboriginal Curios.

THE PRIMITIVE Fish Hook here represented is one made and used by the Aleut Indians in Alaska for catching halibut. It is constructed of two pieces of wood, properly shaped and fastened with a withe, apparently made of some kind of willow or reed, split flat. The iron hook, something like a pointed Wrought Nail, is also secured with a withe. On this hook the bait is placed, and in trying to get it the fish is caught. Passing through the center is a rope about  $\frac{3}{8}$  inch in diameter, made of twisted wifhes, fastened underneath swivel-like, so as to turn freely. When in use the hook maintains a horizontal position. The suggestive action shown in the rude carving in putting the hand to the mouth may be based on actual results in the angler's experience, indicating that with the hook and the hand the mouth is filled. The greatest dimensions of the hook are  $11\frac{1}{4} \times 5$  inches. This interesting curio, temporarily in the possession of Henry C. Squires, 20 Cortlandt street, New York, is the property of Rev. Dr. John C. Bliss of New York, who brought it from Sitka two years ago.

business. Early in 1893 they were obliged to go into the hands of a receiver on account of a suit brought by the town of Hampshire, Ill., in which their factory is located. The cause of the suit was the alleged non-fulfillment of contract. Those who instigated the suit found that their action was not warranted and have had it dismissed. Not only has this vexatious question been settled, but the company have further discharged all their obligations in full and now resume operations with a clean sheet. This has been brought about through the personal efforts of A. J. Warner, president of the company, who has many friends in the Hardware trade, all of whom will be pleased to hear of his success in rebuilding the fortunes of the company. They will continue to manufacture the Warner burglar-proof Lock, which was just being introduced at the time of the suspension. A new steel Night Latch is also to be brought out, which is claimed to be the cheapest Lock of the kind ever produced. The company's office is in the Manhattan Building, Chicago.

THE TRADE of New York have been glad within the past few days to see again in the city Hon. John H. Graham, whose illness together with his duties at Washington as Congressman have for more than a year prevented him from giving his usual attention to business. He is now, however, convalescent and during a visit to the Hardware Club, where he met many of the trade, received a very hearty reception from a host of friends.

## An Arrangement for Keeping Tubing.

THE ACCOMPANYING CUTS, Figs. 1 and 2, relate to an arrangement for keeping Brass Tubing, recently illustrated in the *Hardwareman* of London, England. The staircase is used for keeping Tub-

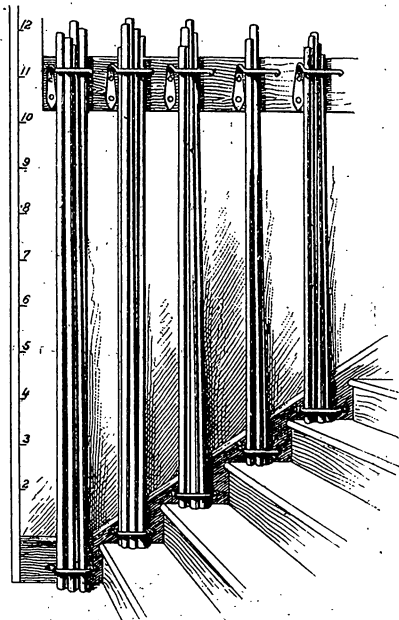


Fig. 1.—An Arrangement for Keeping Tubing.

ing, as indicated in Fig. 1, while Fig. 2 shows the form of the top brackets, which are made of  $\frac{1}{2}$ -inch round iron, flattened for screw holes. A rule is marked in large figures against the wall, by which the length of the rods is quickly ascertained. The originator of this arrangement places 1-inch and  $\frac{3}{4}$ -inch rods on the lowest step,  $\frac{1}{2}$ -

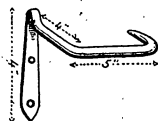


Fig. 2.—Top Bracket in Detail.

and  $\frac{5}{8}$  inch on the second step,  $\frac{1}{2}$  and  $\frac{3}{8}$  inch on the third step, followed by special length and short length rods on the succeeding steps. It would no doubt be feasible to adopt the same plan for keeping long handles where stairways were available for the purpose.

## Dame, Stoddard & Kendall's Catalogue.

DAME, STODDARD & KENDALL, Boston, Mass., have recently issued an illustrated catalogue and price-list which shows a large line of domestic and imported Cutlery, including Table and Pocket Cutlery, Razors, Scissors and Shears; also Razor Strops, Lather Brushes, Shaving Mugs, Cork Screws, Curling Irons, Key Rings, Key Chains, Rules, Measuring Tapes, Opera Glasses, Horse and Toilet Clippers, Thermometers, Skates, &c. The catalogue contains many articles which are used and sold to a greater or less extent by the Hardware trade, but seldom illustrated together in one book.

## Rochester Lamps.

ROCHESTER LAMP COMPANY, 42 Park place and 37 Barclay street, New York, are just issuing their third export catalogue of Rochester Lamps in a great variety of styles and designs. This pamphlet has 40 pages,  $15\frac{1}{2} \times 12\frac{1}{4}$  inches in size, profusely illustrated, and is bound in an illuminated stiff paper cover. It is printed in both the English and Spanish language on each page. One of the features of the catalogue is the line of New Rochester Lamps, said to be new in every particular, especially the wick movement, cone, chimney lift, overflow indicator and improved burner, which gives a double flame and increased combustion. A full assortment is shown, including varieties of Hand, Parlor, Table, Store, Banquet, Piano, Student, Hall and Library Lamps, together with Chandeliers, Bracket Lamps, Lanterns, Street Lamps, Oil Stoves and Heaters, Bicycle Lamps, Lamp Shades and Forms, with a number of kindred specialties. There are also Onyx Cabinets and Tables, both with and without Lamps.

## Trade Items.

AN AUCTION SALE of Granite Iron Ware by order of the St. Louis Stamping Company is announced this week among our Special Notices by E. Bissell, Son & Co., 12 Murray street and 15 Park place, New York. The sale is set down for Friday, October 19. This sale will be a very large one and the goods, though sold as seconds, are, we are advised, all serviceable and desirable for general use. Some 400 Parlor Gas Heaters and a large line of Planished Tea and Coffee Pots will also be disposed of.

NORBERT B. KATES is about to establish a general export agency in New York, to be called the American Manufacturers' Export Association, for the representation of a limited number of manufacturers in such branches as furnish the most inviting fields for creating foreign business. The enterprise will be conducted on a commission basis. Mr. Kates refers to an experience of ten years in this line, covering territory in Europe, South America, Mexico and the Antilles. We are told he has just returned from an extended business trip in South America, where he acted for a number of American producers. His plan, briefly outlined, is to make New York a center from which will issue correspondence and collective advertisements from the manufacturer to the foreign buyer in his own language, while from time to time he will personally travel in the countries referred to.

JOSEPH B. WEED, connected with John H. Graham & Co., New York, has recently returned from a long business trip, largely in the Southwest. His experience with the trade convinces him that the situation is improving gradually, orders being placed conservatively and with judgment.

THEODORE V. SMITH, formerly at 82 John street, New York, is now at 54 in the same street, having been 31 years in the neighborhood. He manufactures a full line of Japanned Tin Cash Boxes, known to the trade as Stationers' Tin Goods, together with Japanned Tin and Iron Plate on which to paint signs. He also makes a line of handsome Wood Boxes or Cabinets in which to keep cigars fresh in very dry or moist atmospheres. Instead of manufacturing these goods in Connecticut, as has been done for a long time, he has secured suitable quarters within a few minutes' walk of the salesroom,

the works having been in operation since July 5 last.

W. A. MERRIFIELD, who has long been secretary of the Stover Mfg. Company, at Freeport, Ill., has also been elected secretary of the Stover Bicycle Mfg. Company of the same place. The latter company held their annual meeting on the 1st inst., at which the business of the past year was found to have been very satisfactory, while the outlook for the coming year was reported as exceedingly encouraging.

IN THEIR ADVERTISEMENT in this issue the Garland Chain Company, Rankin, Pa., direct attention of the trade to their Tie Out or Lariat Chain, for which many points of excellence are claimed. The company report the receipt of large orders from the South for these goods, as well as for Trace Chain, Halter Chains, &c.

JAMES P. KENWORTHY, Hardware merchant, 96 Chambers street, New York, has made an assignment and J. T. Hazell, formerly of Hazell & Patterson, was, on October 9, appointed receiver. The trade will learn with regret of this misfortune. It is hoped a satisfactory settlement may be made and the business continued.

THE TRADE will observe the change in the advertisement of the Arcade File Works, page 64, in which they reproduce a label which they are now using on the goods, in which they call attention especially to Weed's improved cut and the guarantee under which the goods are sold.

## Price-Lists, Circulars, &c.

SILVER & CO., 304-310 Hewes street, Brooklyn, and 20 Warren street, New York: Household inventions. A catalogue and price-list illustrates Aluminum Goods, Asbestos Goods, Beaters, Baking Pans, Broilers, Coffee Pots, Cookers, Oil and Gas Stoves, Display Stands, Flour Bins, Fly Traps, Lamps, Lemon Squeezers, Milk Sterilizers, Potato Peelers, Presses, Toasters, Trousers Stretchers, Tea Kettles, Urns, Water Bug Traps, &c. A portion of the book is devoted to attractions which are referred to as trade winners.

THE GILLETTE CLIPPING MACHINE COMPANY, 201 East Twenty third street, New York: Power Horse Clipping Machines. An artistically printed catalogue illustrates a line of Power Clipping Machines for horses, with flexible shafts. The Machines are arranged to be driven by steam, electric or man power. Attention is directed to the use of steel instead of iron in the construction of the Machines, by which lightness is secured; also to the Leader Knife and to the Feather Weight Clipping Machine, which have recently been put on the market.

HOWARD & MORSE, 45 Fulton street, New York: Wire Goods and Ventilating Wheels. Catalogue No. 120 illustrates Wire Cloth of various kinds, grades and quality; Pressed Wire Cloth, Poultry Netting, Bank and Office Railing, Guards, Plain and Ornamental Garden Wire Work, Iron Fence, Stable Fixtures, Crestings and Finials, Brass Fenders, Mechanical Ventilating Appliances, Solano High Speed Steam Engine, &c.

THE BROWN, HINMAN & HUNTINGTON COMPANY, Columbus, Ohio: Farm and Garden Tools. An 1894-95 catalogue illustrates, with prices, Scythe Snaths, Grain Cradles, Forks, Potato and Manure Hooks, Hoes, Steel and Malleable Garden Rakes, Weeding Rakes and Hoes, Handles, &c. It is printed in their usual elegant and attractive style.



**HARRIMAN HOE & TOOL COMPANY,** Harriman, Tenn.: Handled and Eye Hoes, Rakes and Drain Shovels. An 1894-95 catalogue and price-list illustrates Handled Planters', Handled Cotton, Field, Mortar, Razor Edge, Handled Champion, Southern Queen, and Weeding Ho-s, Giant Eye Hoe, Planters' Eye and Scovill Pattern Eye Hoes; Tiffin Drain Shovel, Decatur Drain Shovel and Malleable and Steel Garden Rakes. It is stated that all Shank Planters' Hoes are fastened in the handle with the company's Giant Grip Fastening.

**E. T. BARNUM,** Detroit, Mich.: Wire and Iron Work. As supplements to his annual spring catalogue, supplementary illustrated catalogues are issued, relating to Jail Work, Wire and Iron Fencing, Bank and Office Railings, Wire Cloth, Roof Cresting, Stable Fixtures, Weather Vanes, Reservoir Vases, Iron Chairs, Settees, &c.

**THE JAMES L. HAVEN COMPANY,** Cincinnati, Ohio: Piano Stools, Benches, Chairs, Scarfs and Music Cabinets. An artistic 1894-95 catalogue illustrates these goods in great variety. The manufacturers state that they have increased their capacity by adding new and improved machinery and that they manufacture all the iron and wood work in their own shops, enabling them to reduce the price considerably and still maintain the quality.

**SCHAW, INGRAM, BATCHER & Co.,** Sacramento, Cal.: Sheet Steel and Iron Pipe. In addition to the manufacture of Sheet Steel and Iron Pipe the company conduct a wholesale and retail Hardware establishment. A catalogue illustrates the company's Pipe works and also gives views of Pipe and Bridges constructed by them for irrigation purposes.

**SCHROETER BROS.,** St. Louis, Mo.: Scroll Saws, Fancy Woods, Foot Power Machinery, Light Hardware and Tools for metal and wood workers. A catalogue and price-list illustrates Scroll Saws, Lathes, Family Tool Chests, Screw Plates, Anvils, Hack Saws, Drills, Punches, Pliers, Oil Stones, Carving Tools, Mathematical Instruments, Planes, Saws, &c.

## It Is Reported—

### California.

That the Hardware firms of E. D. Harris & Co., Alexander Westrup, George S. Brown and J. C. Mailer of SANTA ROSA have agreed to close their stores at 6 p.m., except Saturdays, for a period of one year from October 1, 1894, except during the months of June, July and August, when they will remain open until 7 p.m. It has also been agreed to close the stores from December 15, 1894, to January 1, 1895.

### Colorado.

That the Holmes Hardware Company's store, at PUEBLO, was broken into by burglars on the 26th ult. and a quantity of Hardware taken, mostly Revolvers and Knives.

### Connecticut.

That S. H. Beard of NEW BRITAIN has purchased the entire stock of Stoves and Tinware of Youman Bros. of SOUTHTON.

### Georgia.

That Julius Dreyfus, secretary and treasurer of the Lowry Hardware Company, ATLANTA, has resigned his position. Mr. Dreyfus will dispose of his business interests in ATLANTA and remove to New York City.

### Illinois.

That Mayor John Seaman's Hardware store, at GREENVILLE, was robbed on the 28th ult. Shot Guns, Knives, Pistols, &c., comprised the booty.

That Ziegler Bros., ELGIN, have purchased the store in which their Hardware and plumbing business has been conducted for the past six or seven years for \$9000. They are intending to enlarge the building, making it 120 feet in length, instead of 80 feet, as at present, and will add another story. Their increasing business requires this expansion of facilities.

That Henry Bolte, successor of Roy White in the Hardware business, at GENESEO, has made a number of improvements in his store building.

### Indiana.

That J. D. Berger's Hardware store, at LIGONIER, was robbed on the 23d ult. This is the fourth time within a year or two that Mr. Berger's store has been visited by thieves.

That Moore Bros. have opened a new Hardware store at LAKEVILLE.

### Iowa.

That burglars visited the Hardware store of C. E. Armstrong & Co. of CLINTON on the 26th ult., and helped themselves to Revolvers, Razors and Knives valued at about \$150. Entrance to the store was gained by breaking a pane of glass in one of the office windows in the rear of the store, after which the fastening was released and the window easily opened.

That the store of Murray & Hamm of BOONE was robbed a short time since. The booty consisted of Revolvers and Cutlery.

That Dunmire & Co.'s new two-story brick building is nearing completion and will soon be occupied by their Hardware and Tinware business. The firm are located at FREMONT.

That B. C. Mackrill's Hardware store, at CENTER JUNCTION, was robbed on the 25th ult. A quantity of Cutlery was carried away.

That the TABOR Hardware store of West & Savage was robbed on the 28th ult.

### Kansas.

That the Hardware store of E. J. Fehrenkamp, IRVING, was entered by thieves on the 26th ult. and \$100 worth of Pocket Knives and Razors stolen. Mr. Fehrenkamp has offered a reward of \$25 for the arrest of the thieves and return of the goods.

### Maine.

That the Dingley Hardware Company of GARDINER are about to commence the erection of a three story storehouse.

That M. V. Lander, RUMFORD FALLS, has moved his Hardware business to new quarters.

### Massachusetts.

That G. N. B. Sherman has opened a new Hardware store at NEWTON.

That a new store has just been opened at HOLYOKE by E. D. Wells. Mr. Wells was formerly of the firm of Crosby & Wells, which was dissolved by the death of Mr. Crosby.

### Michigan.

That John H. Ketchum has sold his Hardware stock, at YPSILANTI, to Harding & Shafer, who have removed it to their store. Mr. Ketchum has retired from business, owing to failing health.

That the Hardware store of Benson & Crawford, SARANAC, was entered by burglars on the 27th ult., and Guns, Revolvers and Razors stolen.

### Minnesota.

That W. C. Holmes is the proprietor of a new Hardware store at AUSTIN.

That J. D. Stith has bought out the Hardware and furniture business of M. Lynch at SWANVILLE.

### Missouri.

That Funkhouser & Davis are successors to Wood & Thompson in the Hardware business at WEST PLAINS.

That Joseph Lissner has sold his Hardware store, at BOLCHOW, to W. K. Chamberlain, formerly a resident

of that vicinity, but for the past few years engaged in the mercantile business at Hyannis, Neb. Mr. Lissner will remove to KENT, IOWA.

### Nebraska.

That the Hardware store of Harrington Bros., at PAWNEE CITY, was robbed of \$200 worth of goods on the 20th ult. The firm have offered a reward of \$50 for the apprehension of the thieves.

That on the 1st inst. the Hardware store of G. H. Hillman, BERLIN, was broken into and robbed of about \$20 worth of Cutlery. The thieves effected an entrance by cutting out a panel in the rear door.

### New Hampshire.

That the store of Ira Stowell, NEWPORT, who has recently become the sole proprietor of the Hardware business in Woodbury's block, has been thoroughly repaired and renovated. A new hardwood floor has been laid, plate glass window put in, the office removed to the front and the whole establishment nicely painted.

### New Jersey.

That John Markel & Son, dealers in Iron and Steel, Carriage and Wagon Hardware, NEWARK, who started in business in February, 1893, owing to the increase in their trade are building an extension to their establishment 75 x 30 feet. This building will, it is expected, be completed in a few weeks.

### New York.

That Hanlon Bros., Hardware dealers, MEDINA, own what is claimed to be the most expensive Stove in the world. It is gold plated and cost \$960. This Stove was exhibited at the World's Fair, and is one of the chief attractions at the Orleans County Agricultural exhibition.

That the firm of Phillips & Co., NIAGARA FALLS, having disposed of their property and business to the F. W. Oliver Company, recently incorporated, have been dissolved by mutual consent, the F. W. Oliver Company continuing the business.

### North Carolina.

That Owen F. Love & Co., successors to the Gleaves Hardware Company, WILMINGTON, took possession on the 1st inst. of the handsome and commodious storeroom at 114 North Front street.

### Ohio.

That J. R. Harshberger is desirous of disposing of his Hardware business at MARION.

That J. H. Andrews has sold his Hardware store at MCCONNELLVILLE to C. J. Gibson. Mr. Andrews has gone to Mexico to look after mineral lands owned by his father, and to assist in the construction of about 100 miles of railroad through the mineral lands, so as to get the ore to market.

That R. C. Frederick is building a new Hardware store at JOHNSTOWN.

That A. Shively of HANOVERTON has bought out the Stove and Tinware store of W. R. Evans and taken possession.

### Pennsylvania.

That Frank Kappler's Cutlery store, at ALLENTOWN, was burglarized on the 4th inst. About \$400 worth of the finest goods were taken.

### Texas.

That W. F. Farmer, GEORGETOWN, has bought the stock of Hardware belonging to the L. Dimmitt estate, and will open up a new store.

### Vermont.

That Batchelder & Robinson's Hardware store, at WATERBURY, was broken into by thieves on the 20th ult., who got away with about \$50 worth of goods.

That the Hardware store of Stone & Brewster, RUTLAND, was robbed on the 28th ult.

That the Hardware firm of Andrews & Dawes, ST. JOHNSBURY, has been

dissolved by mutual consent, H. E. Dawes retiring. The business will be continued in the same location by A. V. Andrews under the style of A. V. Andrews & Co.

#### West Virginia.

That Whitescarver & Brake's Hardware store, at BUCHANAN, was burned out on the 4th inst.

#### Wisconsin.

That C. Larsen has opened a new Hardware store at LAKE GENEVA.

That L. J. Sawyer has retired from the Hardware business at COLUMBUS, having sold his stock to Geo. W. Buelow and Edward L. Schulze of Reedsburg. Messrs. Buelow and Schulze, who are young men of push and energy, will continue the business at the old stand. Mr. Sawyer had been identified with the Hardware business for a period of 39 years, and retires to enjoy a well-earned competency.

That Frank Kreuter, for many years a clerk in the Hardware store of A. C. Fuge & Co., WEST BEND, has purchased the Hardware store of B. Notting at PORT WASHINGTON.

That the Sterling Hardware Company of OCONOMOWOC have been incorporated with a capital of \$6000. The incorporators are Harriet S. Gee, Charles L. Gee and Harry F. Gee.

That the Hardware store of Louis Luedke, MERRILL, was destroyed by fire on the 27th ult.

That C. P. Drake & Co.'s Hardware store, at CLINTON, was burglarized recently.

*The Hardware trade throughout the country are requested to report business changes, improvements and other matters of trade interest suitable for mention in this department.*

### Paints and Colors.

*It should be understood that the prices quoted in this column are strictly those current in the wholesale market, and that higher prices are paid for retail lots. The quality of goods frequently necessitates a considerable range of prices.*

**White Lead.**—The situation of the market is quite as unsettled as it was a week ago. Competition has not abated and prices remain on a low basis, or very close to the cost of raw materials, without stimulating business perceptibly. Buyers of Dry Lead are operating cautiously, since market conditions are more or less in their favor and the chances slim for any turn in the upward direction. Lead in Oil sells at all manner of prices and occasionally foreign brands are let go at about the same figures that are quoted for best domestic. The distribution is hardly as large as it usually is at this season of the year.

**Red Lead.**—Some increase is reported in sales of both domestic and foreign brands and the market now shows fairly steady tone. No advance in prices has been established during the week, but it is extremely difficult to duplicate purchases at lowest rates recently accepted.

**Litharge.**—Buyers have taken hold less freely and the demand at present is only fair. Prices for both domestic and foreign brands are still somewhat irregular, but have undergone no decided change the past week.

**Orange Mineral.**—The offering of both German and French brands continues on quite a liberal scale and low prices are still being made by importers. Cheapness fails to stimulate buying, however, and the market is spiritless, as well as rather weak.

**Zincs.**—Comparatively few and only moderate orders have been placed for American Oxide. Foreign brands have been almost neglected. Sellers' prices remain without radical change, but there is enough competition for

business to give the market a rather weak appearance.

**Colors.**—No distinctly new features have developed in the market for any line of dry or oil Colors. Business has been only fair and prices have remained almost stationary all along the line. Some improvement was noted in sales of ready mixed Paints in moderate quantities.

### Oils and Turpentine.

**Linseed Oil.**—City crushers have made no change in their prices. Western and other out of town crushers have held to about the same prices that ruled last week. Apparently the market is thus steady in tone, but buyers are operating in a very indifferent way, and the volume of business is only fair for the season. General carloads of outside brand that were offered a few days ago have been withdrawn, and the presumption is that no formidable surplus remains on hand.

**Cotton Seed Oils.**—The market remains in a rather weak condition. Grinders offer both crude and refined stock at prices slightly under those at which business was done early in the month, and forward deliveries at 1¢ @ 2¢ under the spot quotations. The modified prices have not stimulated business in the least on either export or home trade account.

**Lard Oil.**—Prices have fallen to the basis of 64¢ @ 65¢ for prime stock, city make, and the market is looking rather weak. The lower prices have stimulated business in some degree, but there is hardly the full volume for this season of the year, and buyers are acting indifferently. It is probable that large buyers could secure forward contracts at prices a cent or two under present quotations.

**Fish Oils.**—No further change has been made in the association prices for crude Menhaden Oil and very little business has been done, although export operations involving several thousand barrels are under way. Crude Sperm and crude Whale Oils are wholly unchanged. Pressed and Bleached products are moving out very fairly in jobbing quantities. Cod Oils have undergone no change.

**Spirits Turpentine.**—Prices have ranged a fraction lower and the market remains in a more or less unsettled condition, with speculative doings chiefly responsible. Sales have been made a 28¢ @ 28½¢, price varying to style of package and size of lot. Trade demand in this quarter has been only fair.

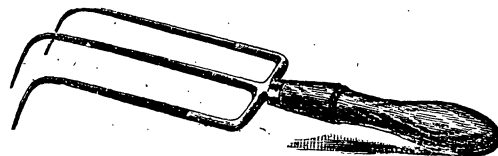
### Iron Stall Fixtures.

J. L. Mott Iron Works, 84-90 Beekman street, New York, are offering a recently patented cast iron stall floor with heavy wood gratings, the latter being both reversible and interchangeable. This device is rectangular in form and pan shaped, 2 feet wide and 6 feet in length from front to rear. It is placed in the center of the stall, there being sufficient grade in the pan to cause all liquid matter to flow rearward into a cast iron gutter running back of the entire range of stalls at right angles with them. All refuse of a liquid nature thus finds an outlet through the slats with the least possible contact, the wood gratings being in two sections flush with the flooring, supported at both sides and in the center longitudinally by a cast iron ridge ½ inch wide. In their exhibit a stall division for use in cow stables is shown made of cast iron posts and ramp rails, which, it is remarked, are of the most approved patterns, calculated to meet with favor among those interested in the construction of cow

stables. Iron has been substituted for wood in the posts and frame work, owing to its acknowledged superiority from a sanitary standpoint, especially valuable where cleanliness is desired. The upright divisions of wood can then be built into the grooves in the castings intended for that purpose.

### Cast Steel Garden Weeder.

Sheble & Klemm, Frankford, Philadelphia, are putting on the market the garden weeder here shown. It is made of cast steel, which, it is claimed,

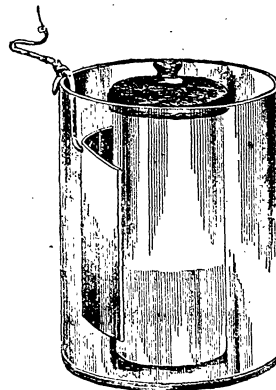


Cast Steel Garden Weeder.

renders the tool much superior to the ordinary iron article. It is described as being well finished, sharp and not likely to clog. It is supplied with either short or long handle.

### Taylor's Battery.

The Taylor Battery Company, 51 Day street, New York, are offering an improved form of cell battery, as here shown. Inside the porous cup are a number of round carbon rods about ¼ inch in diameter, suspended from the

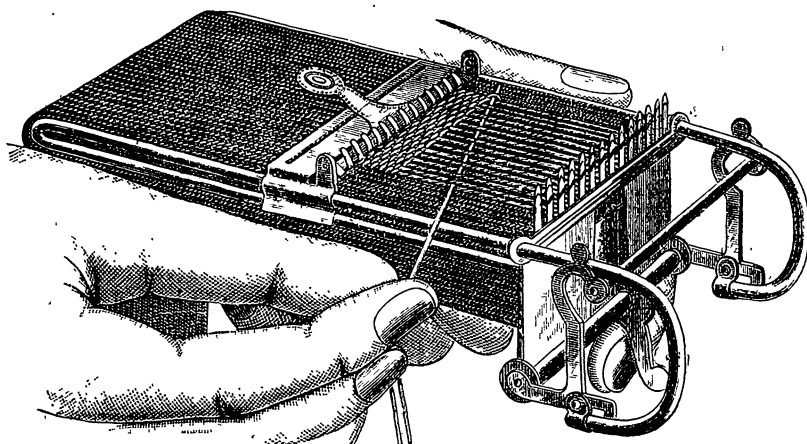


Taylor Battery, Standard Cell.

cap. The zinc plate, hung on one side of the glass jar, the latter being 6 x 8 inches in size, now surrounds but a portion of the porous cup, where formerly it nearly compassed it. As now arranged the zinc is nearly all utilized. Some of the advantages claimed are low internal resistance, large current, high electro-motive force, large capacity, simplicity and convenience. The cells, it is said, can be recharged at a cost of but 2½ cents. The zinc need not be removed from the jar when idle, lasting, the manufacturer says, 900 ampere hours. The zinc is entirely submerged in a solution of one part sulphuric acid and twelve parts water and will last through five charges of the porous cup. There are no creeping salts or fumes if directions are followed. The battery powder can be bought from the company or using recipe sent on application; the materials can be bought anywhere. These batteries are suitable for bells, annunciators, cautery work in surgical practice, phonographs and other purposes for generating electric power.

### The Boecher Darning Machine.

The accompanying cut represents a darning machine offered by The Boecher Darning Machine Mfg. Company, 16 Avenue A, New York. The machine is about 5½ inches long and 2½ inches wide, made of metal, excepting the block of wood for holding the work. The stocking or fabric to be darned is stretched over the block of wood, which is then placed in the machine and held in place by double wires along each side. The hole to be darned is placed on that part of the block over which the needle is being passed, as shown in the cut. The end of the yarn is fastened on one of the end hooks of the cross bar, and then is passed around one point of the teeth at the front of the machine; then back and forth parallel, laying the warp, until the hole is covered, fastening the end of the yarn under the last hook on the cross bar. The principal feature of the machine is the arrangement and movement of the teeth at the front of the machine. They



*The Boecher Darning Machine.*

are cut out of two plates, which work one against the other, and are alternately raised and lowered by pressing the lever at the lower part of the plates. Each tooth has a small notch in the side, in which the yarn is placed when the warp is being laid. Pressing the lever opens the warp, as in a loom. In operation the needle is passed shuttle like through and between the warp, taking a stitch in the material at each edge of the hole, and the lever being pressed after each passage of the needle to change the threads of the warp. After the hole is darned the material is taken from the machine and the overhanging loops are sewed on the body of the material, after which the block is removed and the work is complete. The machine is designed for mending stockings, underwear, children's clothes, table linen, also for doing art and fancy weaving. The manufacturers claim that the machine works perfectly with wool, cotton, silk or linen thread, doing far better work than can be done by hand.

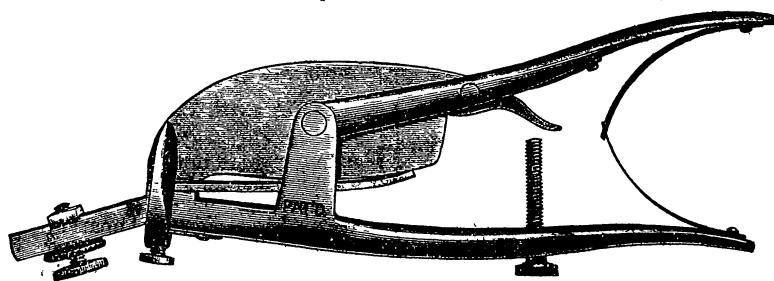
### Spring Hammer Saw Set.

Robert James, Russellville, Ky., is introducing a new saw set, as here shown. In operation the handles are compressed until the spring catch in the upper handle is tripped by being brought in contact with the adjustable screw in the lower handle, which releases the hammer and strikes the tooth the setting blow. The perpendicular

gauge is adjusted for the depth of set, while the sliding gauge and set screw regulate the inclination of the set. The force of the blow given the tooth

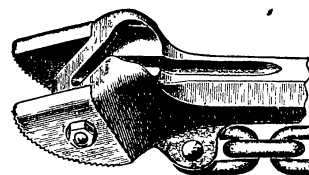
is increased or diminished by the adjustment of the set screw in the lower handle. The saw set measures about 8½ inches over all and is well and strongly made. The manufacturer states that the tool will set the teeth of saws vary-

with the wrench there is no slipping, locking or lost motion. The wrench is made in six sizes, to take pipe from ½ inch to 16 inches in diameter, with



*Spring Hammer Saw Set.*

levers from 27 inches to 84 inches in length. On the three larger sizes the manufacturers will make the length of



*Fig. 2.—Enlarged View of the Head.*

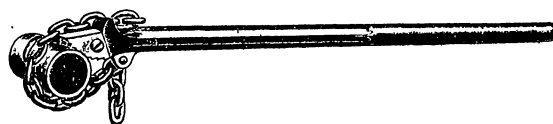
the handle to order, with or without ring, at an extra cost.

### Self Pouring Oil Can.

Asbury-Paine Mfg. Company, Trenton, N. J., are putting on the market the Self Pouring oil can, by which the filling and emptying of lamps and oil stoves is readily accomplished. The self pouring action is due to air pressure exercised on the oil by the special form of lid which is employed. This inverted cup lid slides within the neck of the can. The knob attached to this lid has a small hole through it to act as an air inlet or outlet. As the spout goes to the bottom of the can every drop of oil, it is stated, is poured from the can. The spout forming a siphon, the oil can also, it is claimed, be withdrawn from the lamp or oil stove when desired. The opening in the can is 2½ inches in diameter, so that through it, it is pointed out, the can may be cleaned inside and filled without a funnel, while the size of the opening also permits the oil in the can to be seen. The cleanliness connected with the use of these cans is especially emphasized by the manufacturers. They are made of brass and

### Trimo Giant Pipe Wrench.

The accompanying cuts represent a chain pipe wrench offered by the Trimont Mfg. Company, Roxbury, Mass. The wrench is described as having a solid forged head with detachable interchangeable gripping jaws made from



*Fig. 1.—Trimo Giant Pipe Wrench.*

a fine quality of tool steel. The chain used is the best quality of cable chain. It is explained that the head is so made that the chain is held securely without danger of falling out, as is liable to happen with other similar wrenches, while, it is stated, the chain can readily be released at the will of the operator. The wrench is made and adapted for all kinds of work and for hard and rough usage. The manufacturers claim that

tin, polished, in two sizes, No. 1 holding 2 quarts, and No. 2 holding 4 quarts.

A. W. HIGGINS, secretary of the Laffin & Rand Powder Company, New York, is back at his desk again after passing through a severe illness of some weeks' duration. Following convalescence he spent two weeks away from business recuperating.

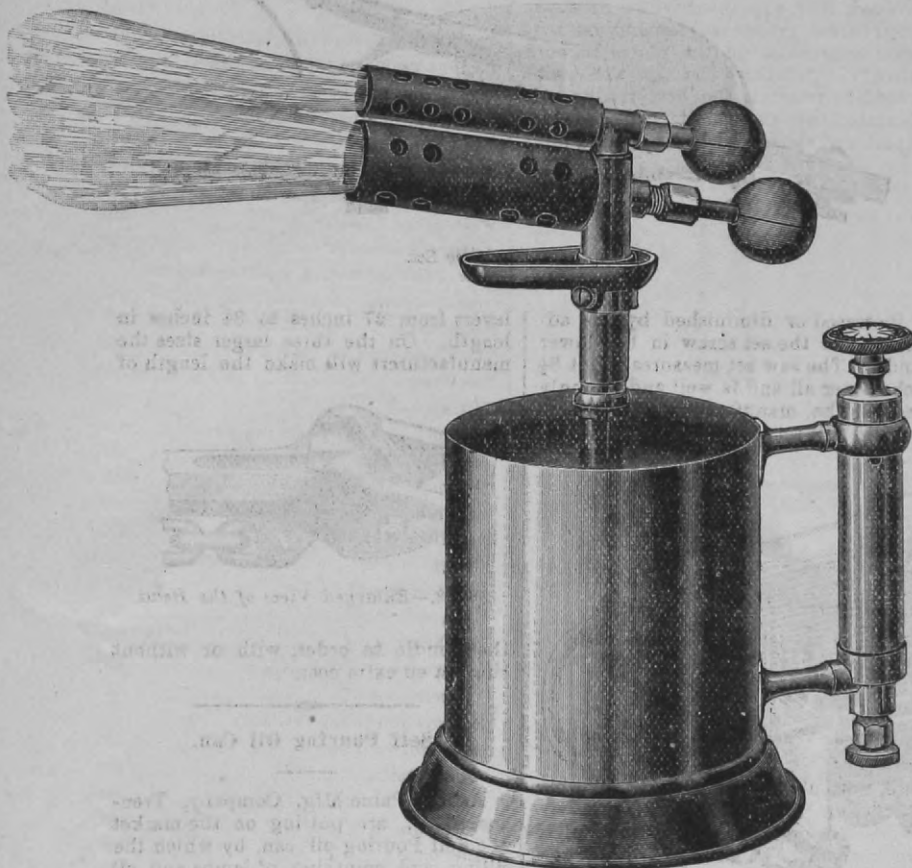


### The Duplex Hot Blast Blow Pipe.

The accompanying illustration shows the Duplex hot blast blow pipe for gasoline, just brought out by the White

piece of specially rolled brass of heavy gauge, rendering it leak proof. The air valve is at the bottom of the pump, dispensing with outside tubes. The pump is simple, but provides a very strong blast while it drains every drop

meeting rail of the lower sash, and the strike or part of the fastener into which the locking bar fastens when the window is closed is secured on the meeting rail of the upper sash. As the lower sash is pulled down, as in Fig. 1, the locking bar is designed to enter the curved space of the strike, thus fastening automatically in the manner shown in Fig. 2. Pivoted to the curved portion of the strike is a gravity latch, which automatically fastens the locking bar as the window is closed, thus preventing the fastener being slipped from the outside with a knife blade or other thin instrument run up between the sash. The manufacturers claim that the fastener locks the window the moment it is closed; that it prevents children opening the window, thus being a safeguard against their falling out; that there is nothing about the fastener to get of order; that it does not interfere with the free movement of the window, and that no extra work is required in putting the fastener on. The goods are furnished in Nubian bronze, real bronze and in brass.



The Duplex Hot Blast Blow Pipe.

Mfg. Company, 40 and 42 State street, Chicago. It is fitted with two burners, one being of the standard size and the other of small size. When heavy work is to be done both burners are used. On light work the small sized burner can be used alone. This tool is intended for soldering, brazing, burning paint, thawing frozen pipes, making heavy soldered joints, &c. The generator is of double the usual strength, but can

of gasoline. The reservoir is tested to 30 pounds pressure.

### Hard to Beat Automatic Sash Fastener.

The Hard to Beat Automatic Sash Fastener Company, 85 Spring street, New York, are putting on the market

SMITH'S PATTERN WORKS, Akron, Ohio, advise us that they have prepared a large number of samples of their leather pattern fillet for distribution among consumers, and that samples will be sent free of charge upon request. They also send out a number of excellent advertising maxims, from which we select the following:

#### Remember This.

People who advertise only once in three months forget that most folk cannot remember a thing longer than seven days.

#### That's So.

Trying to do business without advertising is like winking at a pretty girl through a pair of green goggles. You may know what you are about, but nobody else does.

#### Always Advertise in Dull Times.

To quit advertising in dull times is like tearing out a dam because the water is low. Either plan will prevent good times from ever coming.

#### The Staff of Business.

Bread is the staff of human life and advertising is the staff of business.

W. N. DURANT of Milwaukee, Wis. manufacturer of Counting Machines

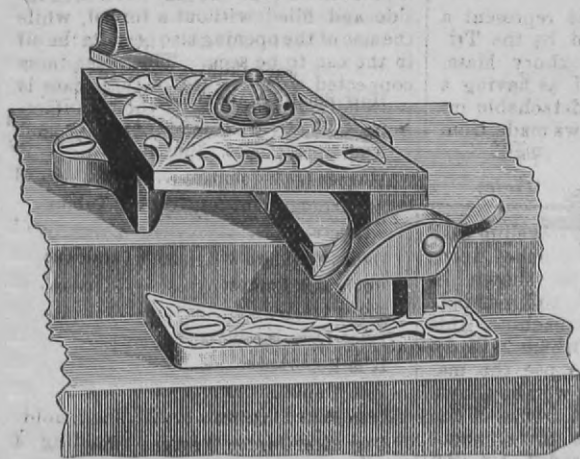


Fig. 1.—Hard to Beat Automatic Sash Fastener.

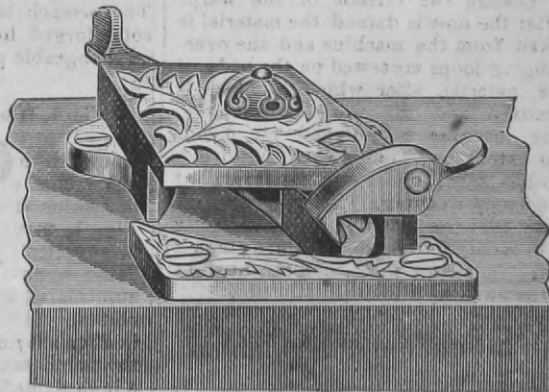


Fig. 2.—Sash Fastener Closed.

be regulated to furnish a flame of any size desired. The needle valve is fitted with a patent renewable seat, which can be replaced when worn out at a cost of only 10 cents, making the torch equal to new. The reservoir is made of one

an automatic sash fastener, as here shown. The locking bar contained in the fastener plate is actuated by a spiral spring, which, it is stated, is made of the best material and cannot break or rust. The fastener plate is secured on the

is distributing blotters, on one side of which is a calendar for October, together with *fac-similes* of letters from users recommending the machines, the printing being tastefully done in inks of a variety of colors.



### The Featherweight Horse Clipper.

Gillette Clipping Machine Company,  
201 East Twenty third street, New  
York, are manufacturing the Feather-

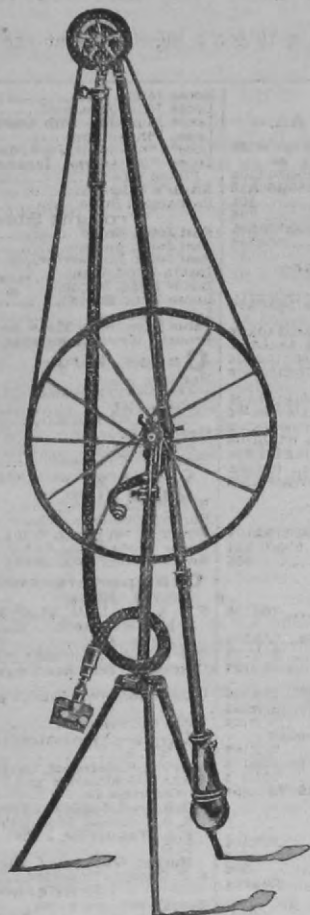


Fig. 1.—The Featherweight Horse Clipper.

weight horse clipper, as shown in the accompanying cuts. The clipper complete is illustrated in Fig. 1, while an enlarged view of the handle and blades is shown in Fig. 2. In Figs. 3 and 4 the parts of the handle and blades are

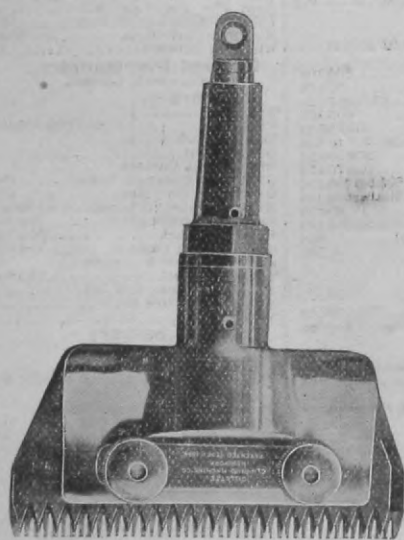


Fig. 2.—Handle and Blades Assembled.

shown in detail. The blades and tension bar, which in connection with the handle are represented in Fig. 2, are designated as the knife and termed by the manufacturers the Leader knife. This, they remark, embodies a late and easily adjusted tension, the tension bar having a central bearing on the upper

side of the handle. It matters not, it is stated, which of the two nuts is turned, as the adjustment is equalized and the pull upward toward the bearings cannot be otherwise than uniform. This feature, although simple, has involved, it is explained, years of study to secure a proper adjustment of tension or pressure on the plates to hold them in contact just at the point requisite to attain the best results. It is stated that the handle can be taken apart and assembled in less than a min-

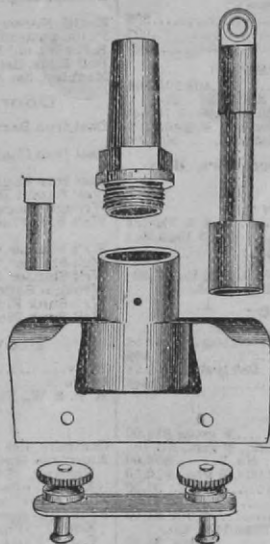


Fig. 3.—Various Parts of Handle.

ute, no tools being required. The clipper, Fig. 1, is supplied with steel wheels throughout, having nickel plated spokes and hubs, also steel bushings in yokes and swivels, together with steel spindles. With this construction the manufacturers call attention to the simplicity, lightness and efficiency of the machine. One handle and two sets of knives—namely, a 3 inch and a 4-inch pair of blades—accompany each machine, the knives being interchange-

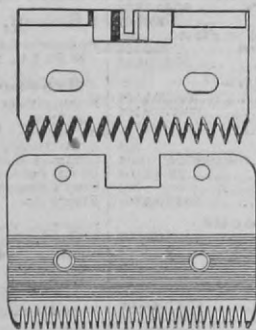


Fig. 4.—Cutter and Comb Plates.

able with the handle. A traveling case 22½ inches square and 5 inches deep, in which the clipper, as shown in Fig. 1, may be packed and carried, is supplied with each machine, this being a novel feature which will be appreciated by those who use the machines. The balancing weight shown in Fig. 1 is made of cast iron. When the purchaser expects to travel about clipping horses a japanned tin can capable of holding a sufficient quantity of water to balance the machine is supplied instead of the iron weight. The can is arranged with a coupling to screw on to the bar and is provided with a screw cap for filling the can with water, thus reducing the weight when carrying the machine. The can when sent from the factory is filled with oil for use on the machine. The legs

of the tripod are slightly curved at the lower ends instead of being straight as shown in Fig. 1.

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# Current Hardware Prices.

OCTOBER 10, 1894.

NOTE.—The quotations given below represent Current Hardware Prices, whether made by manufacturers or jobbers. They apply to such quantities of goods as are usually purchased by retail Hardware merchants. Very small orders and broken packages often command higher prices.

The character @ is used to indicate a range of price: thus discount 50 & 10% @ 50 & 10 & 5%, signifies that the goods in question are sold at prices ranging from 50 & 10% to 50 & 10 & 5%.

## Adjusters, Blind—

Domestic..... \$ dos \$8.00, 83% @ 83% & 10%  
Excelsior..... \$ dos \$10.00..... 50 & 10 & 5%  
North's..... list net @ 10%  
Zimmerman's—See Fasteners Blind.

## Ammunition—See Caps, Cartridges, Shells, &c.

## Anvils—

### American—

Eagle Anvil, 8 in. 96..... 15 & 15 & 5%  
Horse shoe brand, Wrought..... 9% @ 10%  
Barnes Mfg. Co..... 50%

### Imported—

Armstrong Mouse Hole..... 8% @ 9%  
S. & H. machine finished..... 9% @ 10%  
Trenton..... 8% @ 9%  
Peter Wright's..... 9% @ 10%

## Anvil Vise and Drill—

Allen Anvil and Vise \$3.00..... 40 & 10%  
Cheney Anvil and Vise..... 25%  
Millers Falls Co., \$18.00..... 20%  
Holt's..... 40 & 10% & 5%

## Apple Parers—See Parers Apple, &c.

## Augers and Bits—

Boring Machine Augers..... 70 & 70 & 10%  
Car Bits, 12-in. twist..... 50%  
Common Augers and Bits..... 70 & 70 & 10%  
Cincinnati Bell-Hangers' Bits..... 80 & 10%  
Forster Pat. Auger Bits..... 25%  
Jennings' Pattern Auger Bits..... 40%  
Jennings' Pattern Auger Bits..... 60%  
J. E. Jennings & Co., No. 10, extension..... 40%  
C. E. Jennings & Co., No. 30..... 60%  
C. E. Jennings & Co., Auger Bits, 1/2 set..... 82%  
Russell Jennings' Augers and Bits..... 25%  
Lewis' Patent Single Twist..... 45%  
L'Hommedieu Car Bits..... 15 & 10%  
Pugh's Black..... 20%  
Pugh's Jennings Pattern..... 30%  
Snell's Bits..... 60 & 50 & 10% & 5%

## Bit Stock Drills—

Cleveland..... 50 & 10 & 5%  
Cincinnati, for wood..... 40 & 10%  
Cincinnati, for metal..... 50 & 10%  
Morse Twist Drills..... 50 & 10 & 5%  
New Process Twist Drill Co..... 50 & 10 & 5%  
Standard..... 50 & 10 & 5%  
Syracuse, for metal..... 50 & 10 & 5%  
Syracuse, for wood (wood list)..... 50 & 10 & 5%

## Expansive Bits—

Clark's small, \$18, large, \$26..... 40 & 40 & 5%  
Ives' No. 4, \$ dos \$80..... 40 & 40 & 10%  
Steer's, No. 1, \$26; No. 2, \$18..... 40 & 40 & 5%  
Stearns' No. 2, \$48..... 20%  
Swan's..... 40 & 40 & 10%

## Gimlet Bits—

See..... 25 & 25 & 10%  
Common..... \$ gross \$2.50 @ \$3.00  
Diamond..... \$ dos \$1.25..... 40 & 10%  
Double Cut:  
Hartwell's..... \$ gro., \$10.00, 40 & 10%  
Douglass'..... 40 & 10 & 5%  
Ives'..... 60 & 10 & 5%  
Shepardson's..... 45 & 10 & 5%

## Hollow Augers—

Bonney's Adjustable..... \$ dos..... \$21.00  
Cincinnati Adjustable..... 25 & 10%  
Cincinnati Standard..... 25 & 10%  
Douglass'..... 33% @ 33% & 10%  
French, Swift & Co. (Becher)..... 33% @ 33% & 10%  
Ives'..... 33% @ 33% & 10%  
Ives' Expansive, each \$4.50..... 50 & 5%  
Stearns'..... 20 & 10%  
Universal Expansive, each \$4.50..... 20%  
Wood's, \$ dos, \$48..... 25 & 10%

## Ship Augers and Bits—

L'Hommedieu's..... 15 & 10 & 15 & 10 & 5%  
Snell's..... 25 & 25 & 10%  
Snell's Ship Auger Pat'n Car Bits..... 15 & 10 & 15 & 10 & 5%  
Watrous'..... 25 & 25 & 10%

## Awl Hafts—See Hafts, Awl.

## Awls—

Brad, Handled..... \$ gr. \$2.50 @ \$3.00  
Brad, Shoulders..... \$ gr. \$1.30 @ \$1.40  
Peg, Pat..... \$ gr. 35 @ 38%  
Peg, Should..... \$ gr. \$1.50 @ \$1.55  
Scratch, Handled..... \$ gr. \$4.00 @ \$4.50  
Scratch, Socket..... \$ dos \$1.00 @ \$1.20

## Awl and Tool Sets—See Sets, Awl and Tool.

## Axes—

First quality, best brands..... \$6.00 @ \$8.50  
First quality, other brands..... 5.50 @ 6.00  
Beveled add 60¢ @ doz.

## Axle Grease—See Grease, Axle.

## Axles—

No. 1 Common..... 3 @ 3%  
No. 2 Common..... 4 @ 4%  
Nos. 7 to 14..... 70%  
Nos. 15 to 22..... 47%  
Nos. 19 to 22..... 70%  
Concord Axles, loose collar..... 4 @ 4%  
Concord Axles, solid collar..... 5 @ 5%  
Tubular Axles..... 50%

## Bag Holders—See Holders, Bag.

## Balances—

Sash—  
Caldwell, low list..... 30%  
Pulman..... 60%  
Sensible..... 60%

## Spring—

Spring Balances..... 40 & 10 & 50%  
No. 2000 20 30  
Chatillon, \$ dos..... 30.80 0.95 1.75 net  
Chatillon Straight Balances..... 40 & 10%  
Chatillon Circular Balances..... 50 & 10%

## Barb Wire—See Wire, Barb.

## Bars—

Crow—  
Cast Steel..... \$ dos 2% @ 3%  
Iron, Steel Points..... \$ dos 2% @ 3%

## Basins, Wash—

Standard Fiberware, No. 1, 10% in., \$1.80;  
12-inch, \$2.00; 13% inch, \$2.50.

## Beams Scale—

Scale Beams, List Jan. 12, '83.  
50 & 10 & 50 & 10 & 5%  
Chatillon's No. 1..... 40%  
Chatillon's No. 2..... 50 & 10 & 50 & 10 & 5%  
Custers'..... 33%

## Beaters—

Egg—  
Bryant's..... \$ gross \$14.00  
Double (H. & R. Mfg. Co.), \$ gro., No. 0, \$12.00; No. 1, \$15.00; No. 2, \$18.00  
Dover..... \$ dos \$1.00; \$ gro., \$1.50  
Dover, Ex. Family Size..... \$ dos \$1.00  
Dover (Standard Co.)..... \$ dos \$1.00  
Duplex (Standard Co.)..... \$ dos \$1.00  
Duplex Extra Heavy (Standard Co.)..... \$ dos \$1.00  
Easy (H. & R. Mfg. Co.)..... \$ dos \$2.50  
Improved Aome (H. & R. Mfg. Co.)..... \$ gro., \$2.00  
Silver & Co..... \$ gro., \$2.00  
Spiral..... \$ gro \$4.25 @ \$4.50  
Triple (H. & R. Mfg. Co.)..... \$ gro \$1.50 @ \$1.60

## Culinary—

Keystone, P. D. & Co., Each, No. 1, \$1;  
No. 2, \$2..... 20%

## Bells—

Cow—  
Common Wrought..... 60 & 10%  
Kentucky Durham..... 70 & 10%  
Kentucky, Sargent's list..... 70 & 10%  
Kentucky, "Star"..... 20 & 10%  
Texas Star..... 50 & 10%  
Western, Sargent's list..... 70 & 10%

## Door—

Crane Brooks'..... 50 & 10 & 2%  
Crane Cone's..... 10%  
Crane Connel's..... 20 & 10%  
Gong, Abbe's..... 33% @ 10%  
Gong, Barton's..... 40 & 10 & 5%  
Gong, Yankee..... 45 & 10%  
Lever, R. & E. Mfg. Co.'s..... 50 & 10 & 2%  
Lever, Sargent's..... 60 & 10%  
Lever, Taylor's Bronzed or Plated..... 25 & 10%  
Lever, Taylor's Japanned..... 25 & 10%  
Pull, Brook's..... 50 & 10 & 2%

## Electric—

Bigelow & Dowse..... 20 @ 20 & 10%  
Wollensak's..... 20 @ 20 & 10%

## Hand—

Extra Heavy Brass..... 70%  
Light Brass..... 70 & 10 & 70 & 10 & 5%  
Silver Chime..... 33% @ 10%  
White..... 70%  
Globe Cone's Patent..... 25 & 10 & 38%

## Miscellaneous—

Call..... 45 @ 50%  
Farm Bells..... \$ dos 2%  
Steel Alloy Church and School Bells..... 50%

## Bellows—

Blacksmith's..... 67 & 10 & 70%  
Hand Bellows..... 57 & 50 & 10%  
Molders'..... 50 & 50 & 10%

## Belting, Rubber—

Common Standard..... 75 & 10 & 75 & 10 & 5%  
Extra..... 60 & 10 & 50 & 10%  
Standard..... 70 & 10 & 75%  
N.Y.B. & P. Co., Carbon..... 60 & 10 & 5%  
N.Y.B. & P. Co., Double Diamond..... 60%  
N.Y.B. & P. Co., 1846 Para..... 40 & 10%

## Bench Stops—See Stops, Bench.

## Benders and Upsetters, Tire—

Detroit Perfected Tire Bender 15 @ 15 & 10%  
Green River Tire Benders and Upsetters..... 20%  
Stoddard's Lightning Tire Upsetters..... 15%

## Bits—

Auger, Gimlet, Bit Stock Drills, &c., see Augers and Bits.

## Bit Holders—See Holders.

## Blind Adjusters—See Adjusters, Blind.

## Blind Fasteners—See Fasteners, Blind.

## Blind Staples—See Staples, Blind.

## Blocks—

Cleveland Block Co., Mal. Iron..... 50 & 10 & 50 & 10%  
Moore's Novelty, Mal. Iron..... 50 & 50 & 5%  
Saw Grin Steel Tackle Blocks..... 25 @ 25 & 10%

## See also Machines Hoisting.

## Boils—

## Carriage, Machine, &c.—

Com. list June 10, '84..... 80 & 20 @ 80 & 25%  
Genuine Eagle, Norway, list Oct. '84..... 80 & 20 @ 80 & 10%  
Eagle, Norway, list Oct. '84..... 80 & 20 @ 80 & 15%  
Phila. pattern, list Oct. 7, '84..... 80%  
R. B. & W., old list..... 70%  
Bolt Ends, list Jan. 1, 1890, 80 & 20 @ 80 & 25%  
Machine, list Jan. 1, 1890..... 80 & 25%

## Door and Shutter—

Cast Iron Barrel Square, &c..... 75 & 10 @ 75 & 10 & 5%  
Cast Iron Churn (Sargent's list)..... 85 & 10 @ 85 & 10 & 5%  
Cast Iron Shutter, 75 & 10 @ 5 & 10 & 5%  
Ives' Patent Door Bolts..... 60 & 10 @ 60 & 10 & 10%  
Wrought Barrel..... 75 & 10 @ 80%  
Wrt B. K. Flush Common..... 60 & 10 @ 60 & 10 & 10%  
Wrt Shutter, Brass Knob..... 50 & 10 @ 50%  
Wrt Shutter, Sargent's list..... 60% @ 70%  
Wrt Shutter, all iron, Stanley's..... 60% @ 70%  
Wrought Square..... 75 & 10 @ 80%  
Wrt Sunk Flush, Sargent's list..... 60 & 10%  
Wrt Sunk Flush, Stanley's list..... 60 & 10%

## Stove and Plow—

Plow..... 60 & 10 @ 60 & 10 & 10%  
Stove..... 65 @ 70 & 5%  
R. B. & W., Plow..... 65%

## Tire—

Common, list Feb. 28, '83..... 70 & 10%  
American Screw Company..... 70 & 10%  
Norway, Phila., list Oct. 16, '84..... 75 & 10%  
Eagle, Phila., list Oct. 16, '84..... 80 & 10%  
Bay State, list Feb. 28, '83..... 70 & 10%  
Franklin Moore Co.:  
Norway, Phila., list Oct. 16, '84..... 75 & 10%  
Eagle, Phila., list Oct. 16, '84..... 80 & 10%  
Keystone, list Feb. 28, '83..... 70 & 10%  
Empire list Feb. 28, '83..... 70 & 10%  
Keystone, Philadel., list Oct. '84..... 80 & 10%  
Norway, Phila., list Oct. '84..... 75 & 10%  
R. B. & W., Philadel., list Oct. 16, '84..... 75%

## Borers, Tap—

Common and Ring..... 20 & 10%  
Clark's..... 33% @ 35%  
Enterprise Mfg. Co..... 25%  
Ives' Tap Borers..... 33% @ 35%

## Boring Machines—See Machines, Boring.

## Bow Pins—See Pins, Bow.

## Boxes, Letter—

Tatum's..... 40

## Boxes, Wagon—

Per d..... 2%

## Boxes, Miter.

Spilker's Excelsior, 3 in. \$7.50, 4 in. \$8.50, 5 in. \$13.00, 6 in. \$15.00..... 20%

## Braces—

NOTE.—Most Braces are sold at net prices.  
Farber's..... 50 & 10%  
Armstrong's..... 50 & 10%  
Common Rail, American..... \$1.00 @ \$1.10  
Davis Patent..... 50 & 10%  
Fray's Genuine Spofford's..... 50 & 10 & 5%  
Fray's Nos. 70 to 120, 81 to 123, 207 to 414..... 60 & 5%  
Ives' New Haven Novelty..... 70 & 70 & 5%  
New Haven Ratchet..... 60 & 50 & 10%  
Barber Ratchet..... 60 & 50 & 10%  
Barber's..... 60 & 5%  
Spofford..... 60 & 50 & 10%  
P. S. & W. Co., Peck's Patent..... 60%  
Rose & Johnson..... 60%

## Brackets—

Shelf, fancy, Sargent's list..... 70 & 70 & 10%  
Other makes at a wide range of prices.  
Shelf, plain, Regular, list..... 65 @ 70%  
Sargent's list..... 60 & 10 & 70 & 10%  
Bradley Shelf Brackets..... 75%

## Bright Wire Goods—See Wire.

## Brollers—

Hen's Self-Inch..... 9 10 9x11  
Basting, 1 per doz..... \$4.50 5.50 6.50  
Wire Goods..... \$ dos \$12.50  
New Haven..... 50%  
Wire Goods Co..... 55 & 10%

## Buckets, Well and Fire—

## See Pails.

## Bull Rings—See Rings, Bull.

## Butcher's Cleavers—See Cleavers, Butcher's.

## Butts—

## Brass—

Cast Brass, Fast..... 33% @ 10%  
Cast Brass, Loose Joint..... 33% @ 10%  
Cast Brass, Tiebout's..... 60%  
Wrought Brass..... 80 & 10 @ 80 & 20%

## Cast Iron—

Fast Joint, Broad..... 60 & 10 @ 60 & 10 & 10%  
Fast Joint Narrow..... 60 & 60 & 10%

Loose Joint.....  
Loose Joint, Japanned.....  
Loose Joint, Jap. with Acorns..... 75 & 10  
Loose Pin, Acorns..... @ 80%  
Loose Pin, Acorns, Japanned.....  
Loose Pin, Acorns, Japanned, Plated Tip.....  
Mayer's Hinges.....  
Parliament Butts.....

## Wrought Steel—

Fast Joint, Broad.....  
Fast Joint, Narrow.....  
Fast Joint, L. Narrow.....  
Inside Blind, Light.....  
Inside Blind, Regular.....  
Loose Joint, Broad.....  
Loose Pin.....  
Table Butts, Back Flaps, &c.....  
Bronzed Wrought Butts..... 50 & 10 @ 50 & 10 & 5%

## Cages, Bird—

Handy Brass:  
3000, 5000, 1100 series..... 10%  
1200 series..... 40 & 10%  
200, 300, 600 and 900 series..... 40 & 10 @ 50%  
Handy Bronze:  
700, 800 series..... 40 & 10 @ 50%  
Handy Enamelled..... 40 & 10 @ 50%

## Calipers—See Compasses.

## Calks Toe—

Burke's, One Prong, Blunt..... 40 & 10  
Burke's, One Prong, Sharp..... 50 & 10  
Burke's, Two Prong, Blunt..... 50 & 10  
Burke's Two Prong, Sharp..... 50 & 10  
Gautier, One Prong, Blunt..... 50 & 10

## Can Openers—See Openers, Can.

## Cans Milk—

S. B. & Co., 5-gal., \$3.00; 3-gal., \$4.40;  
10-gal., \$4.75 each..... 40 & 10

## Cans Oil—

Galvanized Blue Band, 1 gal., \$ dos \$2.55  
Galvanized Blue Band, 5 gal., \$ dos \$13.00  
Galvanized Blue Band, 5 gal., Faucet..... \$ dos, \$3.00  
Glass Oil, Friend..... \$ dos \$3.75

## Caps—Percussion—

Eley's E. B..... 50 & 55%  
Eley's D Waterproof, Central Fire, \$1.50  
Hicks & Goldmark's and Union Mills  
Cartridge Co..... \$ 100%  
E. B. Grnd. Edge, Cent. Fire, 1-10's..... 47 @ 50%  
E. B. Trimmied Edge, 1-10's..... 47 @ 50%  
F. L. Waterproof, 1-10's..... 35 @ 37%  
G. D..... 27 @ 30%  
Musket, Waterproof, 1-10's..... 50 & 55%  
S. B. Genuine Imported..... 45%

## Primers—

Berdan Primers, \$1.00..... 25  
B. L. Caps (Sturtevant Shells) \$1.00..... 25  
All other Primers, \$1.20..... 25

## Cards—

Watson's Cotton, Wool, Horse and File, list January 28, 1891.....

## Carpet Stretchers—

## See Stretchers, Carpet.

## Cartridges—

B. B. Caps, Con. Ball, Swgd., \$1.85 @ \$1.90  
B. B. Caps, Round Ball..... \$1.80 @ \$1.85  
Blank Cartridges, except 25 and 32 cal., additional 10% to above discounts.  
Blank Cartridges, 22 cal., \$1.75..... 25  
Blank Cartridges, 32 cal., \$3.50..... 25  
Cent. Fire, Military and Sporting 15 & 25 & 32  
Cent. Fire, Pistol and Rifle..... 25 & 35%  
Primed Shells and Bullets..... 15 & 25%  
Rim Fire Cartridges..... 50 & 55%  
Rim Fire Military..... 15 & 25%

## Carpet Sweepers—

## See Sweepers, Carpet.

## Casters—

Bed.....  
Plate..... 60 & 10 @ 60 & 10 & 10%  
Shallow Socket.....  
Deep Socket..... 60%  
Giant Truck..... 85%  
Gwinner's Common..... 45 @ 50%  
Gwinner's Hercules..... 45 @ 50%  
Martin's Patent (Phoenix)..... 45 & 10 @ 50 & 10%  
Payson's Anti-friction..... 70 & 70 & 10%  
Payson's Truck..... 60 & 80 & 10%  
Socket Truck Casters..... 50 & 50 & 10%  
Stationary Truck Casters..... 50 & 50 & 10%  
Tatum's Truck..... 60 & 80 & 10%  
Tucker's Patent, low list..... 45%  
Yale Casters, low list..... 45%  
Yale, Gem..... 70%





**Halters—**

Covert's Adj. Rope Halters.....	40&25
Covert's Adj. Web Halters.....	35&25
Covert's Hemp Horse and Cattle Tie.....	50&10&25
Covert's Jute Cattle Ties.....	70&10&25
Covert's Jute Horse Ties.....	70&25
Covert's Rope, 7/16 in. Jute.....	70&25
Covert's Rope, 1 in. Hemp.....	50&25
Covert's Rope, Jute.....	60&10&10&25
Covert's Saddlery Works Halters.....	33&15
Covert's Saddlery Works Handy Web Halters.....	33&15
Covert's Saddlery Works Horse and Cattle Ties.....	33&15

**Hammers—****Handled Hammers—**

Atha Tool Co.....	
Buffalo Hammer Co.....	50&10&60
Humason & Beckley.....	
Verree.....	
Cheney's Claw.....	40&10
Cheney's Claw & Riveting.....	40&10
O. Hammond & Son.....	40&10
Magnetic Tack, Nos. 1, 2, 3, 1.25, 1.50 & 1.75.....	30&10
Maydole's, list Dec. 1, '85.....	25&10&40
Peck, Stow & Wilcox.....	40&40&5
Fayette R. Plumb.....	
Artisan's Choice, A. E. Nail.....	40&12&15
Engineers' and B. S. Hand.....	60&5
Machinists' Hammers.....	60&15
Regular V. & P. A. E. Nail.....	40&12&15
Other Hammers.....	60&5
Sargent's.....	40&10&50
Warner & Nobles, new list.....	25&10

**Heavy Hammers and Sledges—**

S & B and under.....	40&10
Over 5 lb.....	80&80&10
Over 10 lb.....	80&80&10
Wilkinson's Smiths.....	10&10&10

**Handcuffs and Leg Irons—****See Police Goods.****Handles—****Cross-Cut Saw Handles—**

Atkins.....	40
Champion.....	15
Ely's Perfection.....	40
Sensible.....	40
Pr.....	40

**Iron, Wrought or Cast—**

Barn Door.....	20&5
Bronze Iron Drop Latches.....	60
Chest, Sargent's list.....	50&10&50&10&10
Door or Thumb.....	0
Nos.....	0 1 2 3
Per doz.....	90 100 108 135 150

**Jap'd Store Door Handles—Nuts, 1.10, 1.25, 1.50, 1.75, 2.00, 2.25, 2.50, 2.75, 3.00, 3.25, 3.50, 3.75, 4.00, 4.25, 4.50, 4.75, 5.00, 5.25, 5.50, 5.75, 6.00, 6.25, 6.50, 6.75, 7.00, 7.25, 7.50, 7.75, 8.00, 8.25, 8.50, 8.75, 9.00, 9.25, 9.50, 9.75, 10.00, 10.25, 10.50, 10.75, 11.00, 11.25, 11.50, 11.75, 12.00, 12.25, 12.50, 12.75, 13.00, 13.25, 13.50, 13.75, 14.00, 14.25, 14.50, 14.75, 15.00, 15.25, 15.50, 15.75, 16.00, 16.25, 16.50, 16.75, 17.00, 17.25, 17.50, 17.75, 18.00, 18.25, 18.50, 18.75, 19.00, 19.25, 19.50, 19.75, 20.00, 20.25, 20.50, 20.75, 21.00, 21.25, 21.50, 21.75, 22.00, 22.25, 22.50, 22.75, 23.00, 23.25, 23.50, 23.75, 24.00, 24.25, 24.50, 24.75, 25.00, 25.25, 25.50, 25.75, 26.00, 26.25, 26.50, 26.75, 27.00, 27.25, 27.50, 27.75, 28.00, 28.25, 28.50, 28.75, 29.00, 29.25, 29.50, 29.75, 30.00, 30.25, 30.50, 30.75, 31.00, 31.25, 31.50, 31.75, 32.00, 32.25, 32.50, 32.75, 33.00, 33.25, 33.50, 33.75, 34.00, 34.25, 34.50, 34.75, 35.00, 35.25, 35.50, 35.75, 36.00, 36.25, 36.50, 36.75, 37.00, 37.25, 37.50, 37.75, 38.00, 38.25, 38.50, 38.75, 39.00, 39.25, 39.50, 39.75, 40.00, 40.25, 40.50, 40.75, 41.00, 41.25, 41.50, 41.75, 42.00, 42.25, 42.50, 42.75, 43.00, 43.25, 43.50, 43.75, 44.00, 44.25, 44.50, 44.75, 45.00, 45.25, 45.50, 45.75, 46.00, 46.25, 46.50, 46.75, 47.00, 47.25, 47.50, 47.75, 48.00, 48.25, 48.50, 48.75, 49.00, 49.25, 49.50, 49.75, 50.00, 50.25, 50.50, 50.75, 51.00, 51.25, 51.50, 51.75, 52.00, 52.25, 52.50, 52.75, 53.00, 53.25, 53.50, 53.75, 54.00, 54.25, 54.50, 54.75, 55.00, 55.25, 55.50, 55.75, 56.00, 56.25, 56.50, 56.75, 57.00, 57.25, 57.50, 57.75, 58.00, 58.25, 58.50, 58.75, 59.00, 59.25, 59.50, 59.75, 60.00, 60.25, 60.50, 60.75, 61.00, 61.25, 61.50, 61.75, 62.00, 62.25, 62.50, 62.75, 63.00, 63.25, 63.50, 63.75, 64.00, 64.25, 64.50, 64.75, 65.00, 65.25, 65.50, 65.75, 66.00, 66.25, 66.50, 66.75, 67.00, 67.25, 67.50, 67.75, 68.00, 68.25, 68.50, 68.75, 69.00, 69.25, 69.50, 69.75, 70.00, 70.25, 70.50, 70.75, 71.00, 71.25, 71.50, 71.75, 72.00, 72.25, 72.50, 72.75, 73.00, 73.25, 73.50, 73.75, 74.00, 74.25, 74.50, 74.75, 75.00, 75.25, 75.50, 75.75, 76.00, 76.25, 76.50, 76.75, 77.00, 77.25, 77.50, 77.75, 78.00, 78.25, 78.50, 78.75, 79.00, 79.25, 79.50, 79.75, 80.00, 80.25, 80.50, 80.75, 81.00, 81.25, 81.50, 81.75, 82.00, 82.25, 82.50, 82.75, 83.00, 83.25, 83.50, 83.75, 84.00, 84.25, 84.50, 84.75, 85.00, 85.25, 85.50, 85.75, 86.00, 86.25, 86.50, 86.75, 87.00, 87.25, 87.50, 87.75, 88.00, 88.25, 88.50, 88.75, 89.00, 89.25, 89.50, 89.75, 90.00, 90.25, 90.50, 90.75, 91.00, 91.25, 91.50, 91.75, 92.00, 92.25, 92.50, 92.75, 93.00, 93.25, 93.50, 93.75, 94.00, 94.25, 94.50, 94.75, 95.00, 95.25, 95.50, 95.75, 96.00, 96.25, 96.50, 96.75, 97.00, 97.25, 97.50, 97.75, 98.00, 98.25, 98.50, 98.75, 99.00, 99.25, 99.50, 99.75, 100.00, 100.25, 100.50, 100.75, 101.00, 101.25, 101.50, 101.75, 102.00, 102.25, 102.50, 102.75, 103.00, 103.25, 103.50, 103.75, 104.00, 104.25, 104.50, 104.75, 105.00, 105.25, 105.50, 105.75, 106.00, 106.25, 106.50, 106.75, 107.00, 107.25, 107.50, 107.75, 108.00, 108.25, 108.50, 108.75, 109.00, 109.25, 109.50, 109.75, 110.00, 110.25, 110.50, 110.75, 111.00, 111.25, 111.50, 111.75, 112.00, 112.25, 112.50, 112.75, 113.00, 113.25, 113.50, 113.75, 114.00, 114.25, 114.50, 114.75, 115.00, 115.25, 115.50, 115.75, 116.00, 116.25, 116.50, 116.75, 117.00, 117.25, 117.50, 117.75, 118.00, 118.25, 118.50, 118.75, 119.00, 119.25, 119.50, 119.75, 120.00, 120.25, 120.50, 120.75, 121.00, 121.25, 121.50, 121.75, 122.00, 122.25, 122.50, 122.75, 123.00, 123.25, 123.50, 123.75, 124.00, 124.25, 124.50, 124.75, 125.00, 125.25, 125.50, 125.75, 126.00, 126.25, 126.50, 126.75, 127.00, 127.25, 127.50, 127.75, 128.00, 128.25, 128.50, 128.75, 129.00, 129.25, 129.50, 129.75, 130.00, 130.25, 130.50, 130.75, 131.00, 131.25, 131.50, 131.75, 132.00, 132.25, 132.50, 132.75, 133.00, 133.25, 133.50, 133.75, 134.00, 134.25, 134.50, 134.75, 135.00, 135.25, 135.50, 135.75, 136.00, 136.25, 136.50, 136.75, 137.00, 137.25, 137.50, 137.75, 138.00, 138.25, 138.50, 138.75, 139.00, 139.25, 139.50, 139.75, 140.00, 140.25, 140.50, 140.75, 141.00, 141.25, 141.50, 141.75, 142.00, 142.25, 142.50, 142.75, 143.00, 143.25, 143.50, 143.75, 144.00, 144.25, 144.50, 144.75, 145.00, 145.25, 145.50, 145.75, 146.00, 146.25, 146.50, 146.75, 147.00, 147.25, 147.50, 147.75, 148.00, 148.25, 148.50, 148.75, 149.00, 149.25, 149.50, 149.75, 150.00, 150.25, 150.50, 150.75, 151.00, 151.25, 151.50, 151.75, 152.00, 152.25, 152.50, 152.75, 153.00, 153.25, 153.50, 153.75, 154.00, 154.25, 154.50, 154.75, 155.00, 155.25, 155.50, 155.75, 156.00, 156.25, 156.50, 156.75, 157.00, 157.25, 157.50, 157.75, 158.00, 158.25, 158.50, 158.75, 159.00, 159.25, 159.50, 159.75, 160.00, 160.25, 160.50, 160.75, 161.00, 161.25, 161.50, 161.75, 162.00, 162.25, 162.50, 162.75, 163.00, 163.25, 163.50, 163.75, 164.00, 164.25, 164.50, 164.75, 165.00, 165.25, 165.50, 165.75, 166.00, 166.25, 166.50, 166.75, 167.00, 167.25, 167.50, 167.75, 168.00, 168.25, 168.50, 168.75, 169.00, 169.25, 169.50, 169.75, 170.00, 170.25, 170.50, 170.75, 171.00, 171.25, 171.50, 171.75, 172.00, 172.25, 172.50, 172.75, 173.00, 173.25, 173.50, 173.75, 174.00, 174.25, 174.50, 174.75, 175.00, 175.25, 175.50, 175.75, 176.00, 176.25, 176.50, 176.75, 177.00, 177.25, 177.50, 177.75, 178.00, 178.25, 178.50, 178.75, 179.00, 179.25, 179.50, 179.75, 180.00, 180.25, 180.50, 180.75, 181.00, 181.25, 181.50, 181.75, 182.00, 182.25, 182.50, 182.75, 183.00, 183.25, 183.50, 183.75, 184.00, 184.25, 184.50, 184.75, 185.00, 185.25, 185.50, 185.75, 186.00, 186.25, 186.50, 186.75, 187.00, 187.25, 187.50, 187.75, 188.00, 188.25, 188.50, 188.75, 189.00, 189.25, 189.50, 189.75, 190.00, 190.25, 190.50, 190.75, 191.00, 191.25, 191.50, 191.75, 192.00, 192.25, 192.50, 192.75, 193.00, 193.25, 193.50, 193.75, 194.00, 194.25, 194.50, 194.75, 195.00, 195.25, 195.50, 195.75, 196.00, 196.25, 196.50, 196.75, 197.00, 197.25, 197.50, 197.75, 198.00, 198.25, 198.50, 198.75, 199.00, 199.25, 199.50, 199.75, 200.00, 200.25, 200.50, 200.75, 201.00, 201.25, 201.50, 201.75, 202.00, 202.25, 202.50, 202.75, 203.00, 203.25, 203.50, 203.75, 204.00, 204.25, 204.50, 204.75, 205.00, 205.25, 205.50, 205.75, 206.00, 206.25, 206.50, 206.75, 207.00, 207.25, 207.50, 207.75, 208.00, 208.25, 208.50, 208.75, 209.00, 209.25, 209.50, 209.75, 210.00, 210.25, 210.50, 210.75, 211.00, 211.25, 211.50, 211.75, 212.00, 212.25, 212.50, 212.75, 213.00, 213.25, 213.50, 213.75, 214.00, 214.25, 214.50, 214.75, 215.00, 215.25, 215.50, 215.75, 216.00, 216.25, 216.50, 216.75, 217.00, 217.25, 217.50, 217.75, 218.00, 218.25, 218.50, 218.75, 219.00, 219.25, 219.50, 219.75, 220.00, 220.25, 220.50, 220.75, 221.00, 221.25, 221.50, 221.75, 222.00, 222.25, 222.50, 222.75, 223.00, 223.25, 223.50, 223.75, 224.00, 224.25, 224.50, 224.75, 225.00, 225.25, 225.50, 225.75, 226.00, 226.25, 226.50, 226.75, 227.00, 227.25, 227.50, 227.75, 228.00, 228.25, 228.50, 228.75, 229.00, 229.25, 229.50, 229.75, 230.00, 230.25, 230.50, 230.75, 231.00, 231.25, 231.50, 231.75, 232.00, 232.25, 232.50, 232.75, 233.00, 233.25, 233.50, 233.75, 234.00, 234.25, 234.50, 234.75, 235.00, 235.25, 235.50, 235.75, 236.00, 236.25, 236.50, 236.75, 237.00, 237.25, 237.50, 237.75, 238.00, 238.25, 238.50, 238.75, 239.00, 239.25, 239.50, 239.75, 240.00, 240.25, 240.50, 240.75, 241.00, 241.25, 241.50, 241.75, 242.00, 242.25, 242.50, 242.75, 243.00, 243.25, 243.50, 243.75, 244.00, 244.25, 244.50, 244.75, 245.00, 245.25, 245.50, 245.75, 246.00, 246.25, 246.50, 246.75, 247.00, 247.25, 247.50, 247.75, 248.00, 248.25, 248.50, 248.75, 249.00, 249.25, 249.50, 249.75, 250.00, 250.25, 250.50, 250.75, 251.00, 251.25, 251.50, 251.75, 252.00, 252.25, 252.50, 252.75, 253.00, 253.25, 253.50, 253.75, 254.00, 254.25, 254.50, 254.75, 255.00, 255.25, 255.50, 255.75, 256.00, 256.25, 256.50, 256.75, 257.00, 257.25, 257.50, 257.75, 258.00, 258.25, 258.50, 258.75, 259.00, 259.25, 259.50, 259.75, 260.00, 260.25, 260.50, 260.75, 261.00, 261.25, 261.50, 261.75, 262.00, 262.25, 262.50, 262.75, 263.00, 263.25, 263.50, 263.75, 264.00, 264.25, 264.50, 264.75, 265.00, 265.25, 265.50, 265.75, 266.00, 266.25, 266.50, 266.75, 267.00, 267.25, 267.50, 267.75, 268.00, 268.25, 268.50, 268.75, 269.00, 269.25, 269.50, 269.75, 270.00, 270.25, 270.50, 270.75, 271.00, 271.25, 271.50, 271.75, 272.00, 272.25, 272.50, 272.75, 273.00, 273.25, 273.50, 273.75, 274.00, 274.25, 274.50, 274.75, 275.00, 275.25, 275.50, 275.75, 276.00, 276.25, 276.50, 276.75, 277.00, 277.25, 277.50, 277.75, 278.00, 278.25, 278.50, 278.75, 279.00, 279.25, 279.50, 279.75, 280.00, 280.25, 280.50, 280.75, 281.00, 281.25, 281.50, 281.75, 282.00, 282.25, 282.50, 282.75, 283.00, 283.25, 283.50, 283.75, 284.00, 284.25, 284.50, 284.75, 285.00, 285.25, 285.50, 285.75, 286.00, 286.25, 286.50, 286.75, 287.00, 287.25, 287.50, 287.75, 288.00, 288.25, 288.50, 288.75, 289.00, 289.25, 289.50, 289.75, 290.00, 290.25, 290.50, 290.75, 291.00, 291.25, 291.50, 291.75, 292.00, 292.25, 292.50, 292.75, 293.00, 293.25, 293.50, 293.75, 294.00, 294.25, 294.50, 294.75, 295.00, 295.25, 295.50, 295.75, 296.00, 296.25, 296.50, 296.75, 297.00, 297.25, 297.50, 297.75, 298.00, 298.25, 298.50, 298.75, 299.00, 299.25, 299.50, 299.75, 300.00, 300.25, 300.50, 300.75, 301.00, 301.25, 301.50, 301.75, 302.00, 302.25, 302.50, 302.75, 303.00, 303.25, 303.50, 303.75, 304.00, 304.25, 304.50, 304.75, 305.00, 305.25, 305.50, 305.75, 306.00, 306.25, 306.50, 306.75, 307.00, 307.25, 307.50, 307.75, 308.00, 308.25, 308.50, 308.75, 309.00, 309.25, 309.50, 309.75, 310.00, 310.25, 310.50, 310.75, 311.00, 311.25, 311.50, 311.75, 312.00, 312.25, 312.50, 312.75, 313.00, 313.25, 313.50, 313.75, 314.00, 314.25, 314.50, 314.75, 315.00, 315.25, 315.50, 315.75, 316.00, 316.25, 316.50, 316.75, 317.00, 317.25, 317.50, 317.75, 318.00, 318.25, 318.50, 318.75, 319.00, 319.25, 319.50, 319.75, 320.00, 320.25, 320.50, 320.75, 321.00, 321.25, 321.50, 321.75, 322.00, 322.25, 322.50, 322.75, 323.00, 323.25, 323.50, 323.75, 324.00, 324.25, 324.50, 324.75, 325.00, 325.25, 325.50, 325.75, 326.00, 326.25, 326.50, 326.75, 327.00, 327.25, 327.50, 327.75, 328.00, 328.25, 328.50, 328.75, 329.00, 329.25, 329.50, 329.75, 330.00, 330.25, 330.50, 330.75, 331.00, 331.25, 331.50, 331.75, 332.00, 332.25, 332.50, 332.75, 333.00, 333.25, 333.50, 333.75, 334.00, 334.25, 334.50, 334.75, 335.00, 335.25, 335.50, 335.75, 336.00, 336.25, 336.50, 336.75, 337.00, 337.25, 337.50, 337.75, 338.00, 33**





**Pullers Nail—**

Elipse. . . . . 200, 224.00, 40%  
 Economy. . . . . 200, 224.00, 40%  
 Elipse. . . . . 200, 224.00, 40%  
 Giant, No. 2. . . . . 200, 224.00, 40%  
 Pelican. . . . . 200, 224.00, 40%  
 Soranton. . . . . 200, 224.00, 40%

**Pulleys—**

Brass Screw. . . . . 70%  
 Hay Fork, "Anti-Friction," 5 in. solid. . . . . 50%  
 Hay Fork, "F" Common and Patent. . . . . 50%  
 Hay Fork, Moore's Anti-Friction 5 in. . . . . 20%  
 Hay Fork, Moore's Self-Lubricating. . . . . 40%  
 Hay Fork, Red Eye, 4.00; Swivel. . . . . 40%  
 Hay Fork, Stearns' Nos. 35 & 45. . . . . 50%  
 Hay Fork, Stearns' Nos. 15, 25, 50, 60, 80. . . . . 20%  
 Hay Fork, Tarbox Pat. Iron. . . . . 20%  
 Hot House, Hanging. . . . . 20%  
 Japanned Clothes. . . . . 60%  
 Japanned Screw. . . . . 70%  
 Japanned Side. . . . . 70%  
 Moore's Ceiling or End, Anti-Friction. . . . . 40%  
 Moore's Dumb Waiter, Anti-Friction. . . . . 50%  
 Moore's Electric Light. . . . . 30%  
 Moore's Side, Anti-Friction. . . . . 30%  
 Sash (Auger Mortise). . . . . 60%  
 Common Sense. . . . . 60%  
 Empire. . . . . 60%  
 Aome. . . . . 60%  
 Ideal, Nos. 2, 4, 10 & 15. . . . . 60%  
 Ideal, or IXL No. 30. . . . . 60%  
 On bbl. lots extra 5%. . . . . 60%  
 Shade Rack. . . . . 45%  
 Shepard's Niagara, No. 25. . . . . 20%  
 Tackle Blocks—See Blocks.

**Pumps—**

Olester, Best Makers. . . . . 60%  
 Pitcher Spout, Best Makers. . . . . 70%  
 Pitcher Spout, Cheaper G'ds. . . . . 75%  
 Myers' Pumps, low list. . . . . 60%

**Punches—**

Avery's Revolving. . . . . 40%  
 Avery's Sawset and Punch. . . . . 40%  
 Bemis & Call Co.'s Cast Steel Drive. . . . . 50%  
 Bemis & Call Co.'s Check. . . . . 55%  
 Bemis & Call Co.'s Spring. . . . . 50%  
 Bemis & Call Co.'s Springfield Socket. . . . . 55%  
 Niagara Hollow Punches. . . . . 20%  
 Niagara Solid Punches. . . . . 55%  
 Rice Hand Punches. . . . . 55%  
 Saddle's or Drive, good. . . . . 60%  
 Spring, good quality. . . . . 25%  
 Spring, Leach's Pat. . . . . 15%  
 Solid Timmers', P., S. & W. Co., No. 1. . . . . 55%  
 Timmers' Hollow Punches, P., S. & W. Co. . . . . 20%

**Rail—**

Barn Door, Light. In. . . . . 1.75 2.10 2.75  
 B. D. for N. E. Hangers. . . . . 1.75 2.10 2.75  
 Per 100 feet. . . . . 2.50 3.00  
 Carrier, double braced. Steel Rail, . . . . . 3.00  
 foot. . . . . 3.00  
 Lundy Parlor Door, Flanged Edge, ft. 7. . . . . 45%  
 Moody Steel Rail, ft. 5. . . . . 45%  
 Moore's Steel Rail. . . . . 35%  
 Sliding Door, Bronzed Wrt. Iron, ft. 3. . . . . 35%  
 Sliding Door, Iron, Painted, ft. 3. . . . . 35%  
 Sliding Door, Wrt. Brass, ft. 3. . . . . 35%  
 Terry's Steel Rail. . . . . 40%  
 Victor Track Rail, ft. 4. . . . . 50%

**Rakes—**

Cast Steel, Association G'ds. . . . . 70%  
 Cast Steel, outside goods. . . . . 70%  
 Malleable, good. . . . . 70%  
 Malleable, low grade. . . . . 75%  
 Fort Madison Prize Bow Brass and . . . . . 65%  
 Feathers. . . . . 65%  
 Fort Madison Steel Tooth Lawn Rake. . . . . 25%  
 Gibbs. . . . . 25%  
 Gibbs' Aome Lawn Rake. . . . . 25%  
 Gibbs' Canton Lawn Rake. . . . . 25%  
 Gibbs' Crown Lawn Rake. . . . . 25%  
 Gibbs' Favorite Lawn Rake. . . . . 25%  
 Gibbs' Hustler No. 0. . . . . 25%  
 Gibbs' Hustler No. 1. . . . . 25%  
 Oneida Lawn Rake. . . . . 25%

**Razors—**

Campbell Cutlery Co. . . . . 60%  
 Electric Cutlery Co. . . . . Net prices  
 Galvanic. . . . . 15.00  
 Jordan's AAA, new list. . . . . Net prices  
 Jordan's Old Faithful, new list. . . . . Net prices  
 J. R. Torrey. . . . . Net prices  
 Wostenholm and Butcher, 10 to 2. . . . . 10%

**Razor Straps—**

See Straps, Razor.

**Reels—**

Clothes Line— . . . . . 33%  
 Stearns' Fishing. . . . . 33%  
 Hendryx Aluminum, German Silver, . . . . . 25%  
 Gold Bronze, Silver Rubber, Populo . . . . . 25%  
 and Salmon, Single Action, Multiplying . . . . . 25%  
 and Quadruple, all sizes. . . . . 25%  
 Hendryx Single Action Series, 102P . . . . . 25%  
 and PN, 202P and PN, 102PB and . . . . . 25%  
 PRN, 202PB and PN, 102PB and . . . . . 25%  
 PN, 00304P and PN, 502 and 502N, . . . . . 25%  
 802 and 82N, 02084N, Competitor. . . . . 25%  
 Hendryx Multiplying and Quadruple . . . . . 25%  
 Series, 300N and PN, 4N and PN, . . . . . 25%  
 2904N, 2904P and PN, 02094PN, 0924 . . . . . 25%  
 and 0924N, 5009N and PN. . . . . 25%

**Registers—**

Moore's Bronze Finishes. . . . . 70%  
 Moore's Electroplated. . . . . 75%  
 Moore's Japanned. . . . . 75%  
 Moore's Solid Bronze. . . . . 75%  
 Moore's Stove Pipe. . . . . 35%

**Rings and Ringers—**

Bull Rings— . . . . . 40%  
 Hotchkiss' low list. . . . . 40%  
 Humason, Beckley & Co.'s. . . . . 75%  
 Peck, Stow & W. Co.'s. . . . . 80%  
 Sargent's. . . . . 80%

**Hog Rings and Ringers—**

Note.—The market on Hog Rings and Ringers is in a protracted condition and prices are low and irregular. We therefore withdraw quotations for the present.

**Rivets and Burrs—**

Copper. . . . . 60%  
 Coppered Iron, Betina Brand. . . . . 50%  
 Iron Norway, List Nov. 17 '87. . . . . 55%  
 Second Quality. . . . . 70%

**Rivet Sets—See Sets.****Roasting and Baking Pans—See Pans, Roasting and Baking.****Rods—**

Stair, Black Walnut. . . . . 40%  
 Stair, Brass. . . . . 25%

**Rollers—**

Aome Moore's Anti-Friction. . . . . 55%  
 Barn Door, Sargent's list. . . . . 60%  
 Moore's Barn Door Stay. . . . . 50%  
 Union Barn Door Roller. . . . . 70%  
 Thompson Mfr. Co.'s Lawn Rollers. . . . . 30%

**Rope—The following prices are f.o.b., New York or factory, and are shaded 1/4% on large lots; terms, 1 1/2% for cash.**

Manila, 7-16 in. diam. and . . . . . 8 1/4%  
 larger. . . . . 8 1/4%  
 Manila, 1/4 in. . . . . 8 1/4%  
 Manila, 5-16 in. . . . . 8 1/4%  
 Manila, Tarred Rope. . . . . 7 1/4%  
 Manila, Hay Rope. . . . . 8 1/4%  
 Sisal, 7-16 in. and larger. . . . . 6 1/4%  
 Sisal, 1/4 in. and 5-16 in. . . . . 6 1/4%  
 Sisal, Hay Rope. . . . . 6 1/4%  
 Sisal, Tarred Rope. . . . . 6 1/4%  
 Sisal, Medium Lath Yarn. . . . . 6 1/4%  
 New Zealand. . . . . 5 1/4%  
 New Zealand, 1/4 inch. . . . . 5 1/4%  
 New Zealand, 5-16 in. . . . . 5 1/4%  
 New Zealand, Hay Rope. . . . . 5 1/4%  
 New Zealand, Tarred Rope. . . . . 5 1/4%  
 Cotton Rope. . . . . 12%  
 Jute Rope. . . . . 5 1/4%

**Wire Rope—**

List Sept. 1, 1894. All kinds. . . . . 20%  
 20% & 2 1/2% cash

**Rules—**

Boxwood. . . . . 80%  
 Ivory. . . . . 50%  
 Starrett's Steel Rules and Straight . . . . . 25%  
 Edges. . . . . 25%

**Sad Irons—See Irons, Sad.****Sand and Emery Paper and Cloth—**

See Paper and Cloth.

**Sash Cord—See Cord, Sash.****Sash Locks—See Locks, Sash.****Sash Weights—**

See Weights, Sash.

**Sausage Stuffers or Fillers—See Stuffers or Fillers.****Saws—**

Note.—Extra 5% often given.

Atkins' Circular. . . . . 50%  
 Atkins' Band. . . . . 50%  
 Atkins' Cross Cut, new list. . . . . 50%  
 Atkins' Mill and Drag. . . . . 50%  
 Atkins' One-Man Saw. . . . . 40%  
 Atkins' Wood Saw. . . . . 40%  
 Atkins' Hand Compass, &c. . . . . 40%  
 Diaston's Circular. . . . . 45%  
 Diaston's Cross Cut, list Jan. 1, '93. . . . . 45%  
 Diaston's Band. . . . . 25%  
 E. E. Jennings & Co.'s. . . . . 25%  
 Peace Circular and Mill. . . . . 45%  
 Peace Cross Cuts, list Jan. 1, '93. . . . . 45%  
 Peace Hand, Panel and Rip. . . . . 25%  
 Richardson's Circular and Mill. . . . . 45%  
 Richardson's X Cuts, list Jan. 1, '93. . . . . 45%  
 Simonds' Circular Saws. . . . . 45%  
 Simonds' Crescent Ground Cross Cut . . . . . 30%  
 Simonds' One Man Cross Cuts. . . . . 40%  
 Simonds' Gang, Mill, Mule and Drag . . . . . 45%  
 Saws. . . . . 45%  
 Wheeler, Hagen & Clemons. . . . . 45%  
 Cross Cuts, list Jan. 1, 1893. . . . . 45%  
 Hand, Panel and Rip. . . . . 30%  
 Woodrough & McFarlin. . . . . 45%  
 Cross Cuts, list Jan. 1, 1893. . . . . 45%  
 Hand, Panel and Rip. . . . . 25%

**Hack Saws—**

Eureka and Crescent. . . . . 25%  
 Griffin's, complete. . . . . 40%  
 Griffin's Hack Saw Blades. . . . . 40%  
 Star Hack Saws and Blades. . . . . 25%

**Scroll**

Barnes' No. 1, 2; No. 6, 10; No. 7, 15. . . . . 25%  
 Barnes' Scroll Saw Blades. . . . . 25%  
 Lester, complete. . . . . 25%  
 Rogers, complete. . . . . 25%

**Saw Frames—**

See Frames, Saw.

**Saw Sets—See Sets, Saw.****Saw Tools—See Tools, Saw.****Scale Beams—**

See Beams, Scale.

**Scales—**

Chatillon's Eureka. . . . . 25%  
 Chatillon's Favorite. . . . . 40%  
 Chatillon's Grocers' Trip Scales. . . . . 50%  
 Family, Turnbills. . . . . 30%  
 Hatch, Counter, No. 171. . . . . 100%  
 Hatch Tea, No. 181. . . . . 100%  
 Riehle Bros' Platform. . . . . 40%  
 Union Platform Plain. . . . . 20%  
 Union Platform, Striped. . . . . 20%  
 Standard. . . . . 50%

**Scissors, Fluting—**

Adjustable Box Scraper (B. R. & L. Co.). . . . . 40%  
 Box, 1 Handle. . . . . 40%  
 Box, 2 Handle. . . . . 40%  
 Defence Box and Ship. . . . . 20%  
 Foot, Common. . . . . 50%  
 Foot, Common. . . . . 50%  
 Tatum's Box. . . . . 25%

**Screen Window and Door**

Frames—See Frames

**Screw Drivers—**

See Drivers, Screw

**Screws—**

Bench and Hand—

Bench, 1/4 in. . . . . 55%  
 Bench, 1/2 in. . . . . 55%  
 Bench, Wood, Hickory. . . . . 20%

**Hand, Wood. . . . . 25% & 10% & 25% & 10% & 25%****Hand, Grand Rapids, list. . . . . 35%****Coach, Lag and Hand-Rail—**

Lag, Blunt Point, list Jan. 1, 1890. . . . . 85%  
 Coach and Lag, Gimlet Point, list Jan. 1, 1890. . . . . 80%  
 Hand Rail, M. S. W. Co. . . . . 75%  
 Hand Rail, Sargent's. . . . . 70%  
 Hand Rail, Sargent's. . . . . 70%

**Jack Screws—**

Millers Falls. . . . . 50%  
 Millers Falls, Koller. . . . . 50%  
 F. S. & W. . . . . 35%  
 Sargent. . . . . 70%  
 Stearns. . . . . 40%  
 Tatum's. . . . . 25%

**Cork—**

Detroit Cork Screw Co. . . . . 35%  
 Humason & Beckley Mfg. Co. . . . . 40%  
 Williamson's. . . . . 35%  
 Williamson's Forged Worm, Apple . . . . . 40%  
 Wood, \$5.50. . . . . 40%

**Machine—**

List August 1, 1894. . . . . 45%  
 Flat Head Iron. . . . . 45%  
 Round Head Iron. . . . . 40%

**Wood—**

List January 1, 1891. . . . . 35%  
 Flat Head Iron. . . . . 75%  
 Flat Head Brass. . . . . 85%  
 Round Head Brass. . . . . 75%  
 Flat Head Bronze. . . . . 80%  
 Round Head, Bronze. . . . . 75%  
 Rogers' Drive Screws. . . . . 87%

**Scroll Saws—See Saws, Scroll.****Scythes—**

Grass. . . . . 40%  
 Scythes. . . . . 40%

**Scythe Snaths—**

See Snaths, Scythe.

**Sets—**

Awl and Tool—

Aiken's Sets, Awls and Tools. . . . . 60%  
 No. 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100. . . . . 60%  
 Common Brad Sets. . . . . 70%  
 No. 42, 10.50, 10.45, 12.50, 12.45, 12.40, 12.35, 12.30, 12.25, 12.20, 12.15, 12.10, 12.05, 12.00, 11.95, 11.90, 11.85, 11.80, 11.75, 11.70, 11.65, 11.60, 11.55, 11.50, 11.45, 11.40, 11.35, 11.30, 11.25, 11.20, 11.15, 11.10, 11.05, 11.00, 10.95, 10.90, 10.85, 10.80, 10.75, 10.70, 10.65, 10.60, 10.55, 10.50, 10.45, 10.40, 10.35, 10.30, 10.25, 10.20, 10.15, 10.10, 10.05, 10.00, 9.95, 9.90, 9.85, 9.80, 9.75, 9.70, 9.65, 9.60, 9.55, 9.50, 9.45, 9.40, 9.35, 9.30, 9.25, 9.20, 9.15, 9.10, 9.05, 9.00, 8.95, 8.90, 8.85, 8.80, 8.75, 8.70, 8.65, 8.60, 8.55, 8.50, 8.45, 8.40, 8.35, 8.30, 8.25, 8.20, 8.15, 8.10, 8.05, 8.00, 7.95, 7.90, 7.85, 7.80, 7.75, 7.70, 7.65, 7.60, 7.55, 7.50, 7.45, 7.40, 7.35, 7.30, 7.25, 7.20, 7.15, 7.10, 7.05, 7.00, 6.95, 6.90, 6.85, 6.80, 6.75, 6.70, 6.65, 6.60, 6.55, 6.50, 6.45, 6.40, 6.35, 6.30, 6.25, 6.20, 6.15, 6.10, 6.05, 6.00, 5.95, 5.90, 5.85, 5.80, 5.75, 5.70, 5.65, 5.60, 5.55, 5.50, 5.45, 5.40, 5.35, 5.30, 5.25, 5.20, 5.15, 5.10, 5.05, 5.00, 4.95, 4.90, 4.85, 4.80, 4.75, 4.70, 4.65, 4.60, 4.55, 4.50, 4.45, 4.40, 4.35, 4.30, 4.25, 4.20, 4.15, 4.10, 4.05, 4.00, 3.95, 3.90, 3.85, 3.80, 3.75, 3.70, 3.65, 3.60, 3.55, 3.50, 3.45, 3.40, 3.35, 3.30, 3.25, 3.20, 3.15, 3.10, 3.05, 3.00, 2.95, 2.90, 2.85, 2.80, 2.75, 2.70, 2.65, 2.60, 2.55, 2.50, 2.45, 2.40, 2.35, 2.30, 2.25, 2.20, 2.15, 2.10, 2.05, 2.00, 1.95, 1.90, 1.85, 1.80, 1.75, 1.70, 1.65, 1.60, 1.55, 1.50, 1.45, 1.40, 1.35, 1.30, 1.25, 1.20, 1.15, 1.10, 1.05, 1.00, 9.95, 9.90, 9.85, 9.80, 9.75, 9.70, 9.65, 9.60, 9.55, 9.50, 9.45, 9.40, 9.35, 9.30, 9.25, 9.20, 9.15, 9.10, 9.05, 9.00, 8.95, 8.90, 8.85, 8.80, 8.75, 8.70, 8.65, 8.60, 8.55, 8.50, 8.45, 8.40, 8.35, 8.30, 8.25, 8.20, 8.15, 8.10, 8.05, 8.00, 7.95, 7.90, 7.85, 7.80, 7.75, 7.70, 7.65, 7.60, 7.55, 7.50, 7.45, 7.40, 7.35, 7.30, 7.25, 7.20, 7.15, 7.10, 7.05, 7.00, 6.95, 6.90, 6.85, 6.80, 6.75, 6.70, 6.65, 6.60, 6.55, 6.50, 6.45, 6.40, 6.35, 6.30, 6.25, 6.20, 6.15, 6.10, 6.05, 6.00, 5.95, 5.90, 5.85, 5.80, 5.75, 5.70, 5.65, 5.60, 5.55, 5.50, 5.45, 5.40, 5.35, 5.30, 5.25, 5.20, 5.15, 5.10, 5.05, 5.00, 4.95, 4.90, 4.85, 4.80, 4.75, 4.70, 4.65, 4.60, 4.55, 4.50, 4.45, 4.40, 4.35, 4.30, 4.25, 4.20, 4.15, 4.10, 4.05, 4.00, 3.95, 3.90, 3.85, 3.80, 3.75, 3.70, 3.65, 3.60, 3.55, 3.50, 3.45, 3.40, 3.35, 3.30, 3.25, 3.20, 3.15, 3.10, 3.05, 3.00, 2.95, 2.90, 2.85, 2.80, 2.75, 2.70, 2.65, 2.60, 2.55, 2.50, 2.45, 2.40, 2.35, 2.30, 2.25, 2.20, 2.15, 2.10, 2.05, 2.00, 1.95, 1.90, 1.85, 1.80, 1.75, 1.70, 1.65, 1.60, 1.55, 1.50, 1.45, 1.40, 1.35, 1.30, 1.25, 1.20, 1.15, 1.10, 1.05, 1.00, 9.95, 9.90, 9.85, 9.80, 9.75, 9.70, 9.65, 9.60, 9.55, 9.50, 9.45, 9.40, 9.35, 9.30, 9.25, 9.20, 9.15, 9.10, 9.05, 9.00, 8.95, 8.90, 8.85, 8.80, 8.75, 8.70, 8.65, 8.60, 8.55, 8.50, 8.45, 8.40, 8.35, 8.30, 8.25, 8.20, 8.15, 8.10, 8.05, 8.00, 7.95, 7.90, 7.85, 7.80, 7.75, 7.70, 7.65, 7.60, 7.55, 7.50, 7.45, 7.40, 7.35, 7.30, 7.25, 7.20, 7.15, 7.10, 7.05, 7.00, 6.95, 6.90, 6.85, 6.80, 6.75, 6.70, 6.65, 6.60, 6.55, 6.50, 6.45, 6.40, 6.35, 6.30, 6.25, 6.20, 6.15, 6.10, 6.05, 6.00, 5.95, 5.90, 5.85, 5.80, 5.75, 5.70, 5.65, 5.60, 5.55, 5.50, 5.45, 5.40, 5.35, 5.30, 5.25, 5.20, 5.15, 5.10, 5.05, 5.00, 4.95, 4.90, 4.85, 4.80, 4.75, 4.70, 4.65, 4.60, 4.55, 4.50, 4.45, 4.40, 4.35, 4.30, 4.25, 4.20, 4.15, 4.10, 4.05, 4.00, 3.95, 3.90, 3.85, 3.80, 3.75, 3.70, 3.65, 3.60, 3.55, 3.50, 3.45, 3.40, 3.35, 3.30, 3.25, 3.20, 3.15, 3.10, 3.05, 3.00, 2.95, 2.90, 2.85, 2.80, 2.75, 2.70, 2.65, 2.60, 2.55, 2.50, 2.45, 2.40, 2.35, 2.30, 2.25, 2.20, 2.15, 2.10, 2.05, 2.00, 1.95, 1.90, 1.85, 1.80, 1.75, 1.70, 1.65, 1.60, 1.55, 1.50, 1.45, 1.40, 1.35, 1.30, 1.25, 1.20, 1.15, 1.10, 1.05, 1.00, 9.95, 9.90, 9.85, 9.80, 9.75, 9.70, 9.65, 9.60, 9.55, 9.50, 9.45, 9.40, 9.35, 9.30,

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**Silver Plated, Hollow-**  
4 mo. or 5¢ cash in 30 days.  
Meriden Britannia Co. .... 40¢  
Reed & Barton ..... 40¢  
Rogers & Brother ..... 40¢  
Simpson, Hall, Miller & Co. .... 40¢  
Harford Silver Plate Co. .... 40¢  
William Rogers Mfg. Co. .... 40¢

**Washers-**  
Size hole ..... 5-16 3/4 1/2 5/8 3/4 7/8 1 1/4  
Washers ..... 4.30 3.30 2.55 2.30  
In lots less than 2000, 7¢ b, add 1/4¢ b  
boxes 1¢ to list.

**Whips**

American Whip Co.	Length.	4 1/2	5	5 1/2	6	6 1/2	7	7 1/2	8 ft.
X. L. Whalebone Drivins		\$18.00	20.00	22.00	24.00	27.00	30.00	33.00	36.00
Eureka, Two-thirds Whalebone		15.00	16.50	18.00	20.00	22.00	24.00	27.00	30.00
Bull Bone, Half-length Whalebone		8.00	8.50	9.00	9.50	10.00	10.50	11.00	11.50
American Standard		6.00	6.50	7.00	7.50	8.00	8.50	9.00	9.50
True Grip, Raw Hide		6.00	6.50	7.00	7.50	8.00	8.50	9.00	9.50
New Name, Stocked Java, Black and Wine Colors		6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
Americus, 98 Pen Whip		6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
Gents' Light Driving No. 111		6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
Gents' Light Driving No. 109		6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
Hand-made Stocked Java No. 103		6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
A large variety of cheaper grades		5.75	4.00						
Team Whips									\$2.00@47.50
Toy Whips									\$2.50@112.00
Hardware Assortment, 10/American, 75 Whips for \$50.00									

**W and Wire Goods-Iron**

Market.  
Br. & Ann., Nos. 0 to 18. 75¢@80¢  
Cord'd, Nos. 0 to 18. 75¢@80¢  
Galv. Nos. 0 to 18 70¢@75¢  
Tin'd, Nos. 0 to 18 75¢@75¢  
Tin'd, Nos. 0 to 18 75¢@75¢

**Washer Cutters-**

See Cutters, Washers.

**Water Coolers-**

See Coolers, Water.

**Wedges-**

See Wedges.

**Weights Sash-**

See Sash, Weights.

**Well Buckets Galvan-**

ized-See Pails, Galvanized.

**Wheels Well-**

8 in., \$2.00; 10 in., \$2.50; 12 in., \$2.75

**Galvanized Fences-**

Malin's An'ated & Tin'd on Spools. 60¢@65¢

Malin's Brass and Cop. on Spools. 50¢@55¢

Steel Music Wire, 12 to 30, imported. 60¢@70¢

Stub's Steel Wire. \$6.00 to 2.30

Tate's Spooled, Tin'd & Annealed. 60¢@65¢

Tate's Spooled, Top and Brass. 50¢@55¢

Tinned Broom Wire, 18 to 21. 7¢@7 1/2¢

Wire Clothes Line, see Lines.

Wire Picture Cord, see Cord.

**Bright Wire Goods-**

Standard list. . . . . 80¢@90¢@15¢

**Wire Cloth and Netting-**

Galvanized Wire Netting. . . . . 80¢@80¢@10¢@5¢

Painted Screen Cloth 100 ft \$1.45@1.60

**Wire Barb-**

See Trade Report.

**Wire Rope-See Rops, Wire.****Wrenches-**

American Adjustable. 40¢@40¢@10¢

Baxter's Adjustable "8". 40¢@10¢@50¢

Baxter's Diagonal. 60¢@80¢@10¢

Coe's Genuine. 50¢@10¢@50¢

Coe's "Mechanics". 50¢@10¢@50¢

Girard Standard. 65¢@10¢@70¢

Lamson & Sessions' Engineers. 60¢@10¢

Lamson & Sessions' Standard. 70¢@10¢

Girard Agricultural. 75¢@10¢@10¢

Lamson & Sessions' Agric'l. 75¢@10¢@10¢

P. S. & W. Agricultural. 80¢@5¢

W. & B. Diamond. 50¢@50¢@10¢

Acme, Bright. 50¢@50¢@10¢

**Acme, Nickel-**

Alken's Pocket (Bright). 40¢@40¢@5¢

Alligator. 60¢@10¢

Always Ready. 33¢@10¢@40¢@5¢

**Bemis & Call's:**

Adjustable S. 35¢@5¢

Brigg's Pattern. 30¢@10¢

Combination Black. 40¢@10¢

Combination Bright. 40¢@5¢

Cylinder or Gas Pipe. 45¢@5¢

Extra Heavy. 45¢

Merrick's Pattern. 45¢

No. 3 Pipe Bright. 55¢

Bit Wrench, Adj., Tatum's. 55¢

Boardman's. 30¢@30¢@5¢

Cincinnati Brace Wrenches. 25¢@10¢

Diamond Steel. 55¢@5¢

Donohue's Engineer. 20¢@10¢

Eagle. 50¢@10¢

Hercules. 70¢@10¢

Patent Wrench. 55¢@10¢

Tatum's Brace. 25¢@10¢

The Favorite Pocket. 40¢@40¢@5¢

Walker's. 55¢@5¢

Webster's Pat. Combination. 25¢

**Wringers, Clothes-**

In lots of less than one dozen.

Am. Wringer Co.'s list, July 2, '94. 2¢ cash

Colby Wringer Co.'s list, May 1, '94. 2¢ cash

Loell Mfg. Co.'s list, July 2, 1892. 2¢ cash

Peerless Mfg. Co.'s list, Feb. 1, 1892. 2¢ cash

National Wringer & Mfg. Co.'s list, June 1, 1892. 2¢ cash

**Wrought Goods-**

Staples, Hooks, &c., list, March 17, 1892. 85¢@25¢@9¢

# Paints, Oils and Colors.—Wholesale Prices.

**Animal and Vegetable Oils-**

Linseed, City, raw, per gal.	54	@	54
Linseed, City, boiled	57	@	57
Linseed, Western, raw	55	@	54
Lard, City, Extra Winter	65	@	65
Lard, City, Prime	65	@	65
Lard, City, Extra No. 1	43	@	48
Lard, City, No. 1	43	@	45
Lard, Western, prime	63	@	65
Cotton-seed, Crude, prime	26	@	28
Cotton-seed, Crude, off grades	26	@	27
Cotton-seed, Summer Yellow, prime	31	@	32
Cotton-seed, Summer Yellow, off grades	31	@	32
Sperm, Crude	58	@	58
Sperm, Natural Spring	56	@	56
Sperm, Bleached Spring	51	@	51
Sperm, Natural Winter	63	@	63
Sperm, Bleached Winter	68	@	68
Whale, Crude	41	@	42
Whale, Natural Winter	41	@	42
Whale, Bleached Winter	44	@	44
Whale, Extra Bleached	46	@	47
Sea Elephant, Bleached	22	@	23
Menhaden, Crude, Sound	22	@	23
Menhaden, Crude, Southern	25	@	26
Menhaden, Light Pressed	25	@	26
Menhaden, Bleached Water	33	@	34
Menhaden, Extra Bleached	35	@	36
Tallow, City, prime	51	@	52
Tallow, Western, prime	51	@	52
Cocoonut, Ceylon	64	@	64
Cocoonut, Cochinchina	74	@	74
Cod, Domestic	30	@	30
Cod, Foreign	30	@	32
Red Elaine	35	@	38
Red Saponified	44	@	44
Bank, per gal	25	@	27
Straits	25	@	26
Olive, Italian, bbls.	65	@	68
Neatsfoot, prime	60	@	62
Palm, prime, Lagos	54	@	54

**Mineral Oils-**

Black, 29 gravity, 25 @ 30	04 1/2	@	7 1/4
cold test, per gal			
Black, 29 gravity, 15 cold	7	@	8
test			
Black, 29 gravity, summer	54	@	64

Cylinder light, filtered	12	@	16
Cylinder, dark, filtered	10	@	13
Paraffine, 23 1/2 @ 24 gravity	11	@	12
Paraffine, 25 gravity	9 1/2	@	10 1/2
Paraffine, 28 gravity	7 1/2	@	7 3/4
Paraffine, red	9 1/2	@	10 1/2

**Paints and Colors-**

Barytes, Foreign, 10 ton	\$22.00	@	\$24.00
Barytes, Amer. floated	29.00	@	\$32.00
Barytes, Amer. No. 1	18.00	@	\$18.00
Barytes, Amer. No. 2	15.00	@	\$16.00
Barytes, Amer. No. 3	11.00	@	\$12.00
Blue, Celestial	6	@	8
Blue, Chinese	40	@	50
Blue, Prussian	25	@	40
Blue, Ultramarine	8	@	25
Brown, Spanish	3	@	3 1/2
Brown, Vandyke	8	@	8
Brown, Vandyke, English	6	@	8
Carmine, No. 40, in bulk	2.00	@	8
Carmine, No. 40, in boxes	2.10	@	8
Carmine, No. 40, in ounce bottles	3.00	@	8
Chalk, in bulk	1.75	@	2.00
Chalk, in bbls. 100 lb.	33	@	40
China Clay, English	13.00	@	\$18.00
Cobalt Oxide, prep'd	9.00	@	\$11.00
Cobalt Oxide, black	1.90	@	1.90
Cobalt Oxide, black, less 100 lb.	1.96	@	2.3
Green, Paris, in bulk	25	@	23 1/2
Green, Paris, 170 @ 175 lb	25	@	23 1/2
Green, Paris, small pack	25	@	23 1/2
Rebates, -3¢ 3/4 b on lots of 10,000 lb or over; 2 1/2¢ on 400 to 10,000 lb; 2¢ on 200 to 400 lb; 1 1/2¢ on 100 to 200 lb; 1¢ on 50 to 100 lb purchased during the season.			
Green, Chrome, ordinary	6	@	12
Green, Chrome, pure	22	@	25
Lead, Eng. B.B. white	54	@	64
Lead, Amn. White	4	@	4 1/2
Dry	5 1/2	@	5 1/2
In Oil	5 1/2	@	5 1/2
Lead, White, in oil, 25 lb tin			
pails, add to keg price			
Lead, White, in oil, 12 1/2 lb tin			
pails, add to keg price			
Lead, White, in oil, 1 to 5 lb assorted tins, add to keg price			

Lead, Red, bbls. and 1/4 bbls.	4 1/2	@	5
Lead, Red, kegs	5	@	5 1/2
Litharge, kegs	4 1/2	@	5
Litharge, bbls. and 1/4 bbls.	5	@	5
Ocher, French Washed	1 1/2	@	1 1/2
Ocher, German Washed	1 1/2	@	1 1/2
Ocher, American	1 1/2	@	1 1/2
Orange Mineral, English	7 1/2	@	8
Orange Mineral, French	10	@	10 1/2
Orange Mineral, German	7 1/2	@	8
Orange Mineral, American	7 1/2	@	8
Red, Indian, English	5	@	15
Red, Indian, American	2	@	5
Red, Turkey	9	@	14
Red, Tuscan	7	@	10
Red, Venetian, American	70	@	100
Red, Venetian, English	1.10	@	1.35
Sienna, Italian, Burnt and Powd.	4	@	5
Sienna, Ital., Burnt Lumps	1 1/2	@	3 1/2
Sienna, Ital., Raw, Powd.	4 1/2	@	5 1/2
Sienna, Ital., Raw, Lumps	1 1/2	@	3 1/2
Sienna, American, Burnt and Powd.	1 1/2	@	3 1/2
Talc, French	1 1/2	@	1 1/2
Talc, American	1	@	1 1/2
Terra Alba, Fr'ch. 100 lb	65	@	75
Terra Alba, English	65	@	75
Terra Alba, American No. 1	45	@	60
Umber, Turkey, Burnt and Powd.	2 1/2	@	3 1/2
Umber, Turkey, Raw and Powd.	2 1/2	@	3 1/2
Umber, Turkey, Bnt. Amer.	1 1/2	@	1 1/2
Umber, Turkey, R/W Amer.	1 1/2	@	1 1/2
Yellow, Chrome	10	@	25
Vermilion, American Lead	11	@	12
Vermilion, Quicksilver, bulk	43	@	44
Vermilion, Quicksilver, bags	44	@	44
Vermilion, Quicksilver sm't	52	@	52
Vermilion, English Import	55	@	60
Vermilion, Imitation, Eng.	8	@	30
Vermilion, Trieste	90	@	95
Vermilion, Chinese	85	@	100
Whiting Common, 100 lb	40	@	45
Whiting, American, dry	50	@	55
Zinc, American, dry	3 1/2	@	4 1/2
Zinc, French, Red Seal	7	@	7 1/2

Zinc, French, Green Seal	8 1/2	@	9
Zinc, French, V. M. X.	6	@	7
Zinc, Antwerp, Red Seal	6	@	6 1/2
Zinc, Antwerp, Green Seal	6 1/2	@	7 1/2
Zinc, German	5	@	5
Zinc, V. M. in Poppy Oil, G. Seal, lots of 1 ton and over			





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